

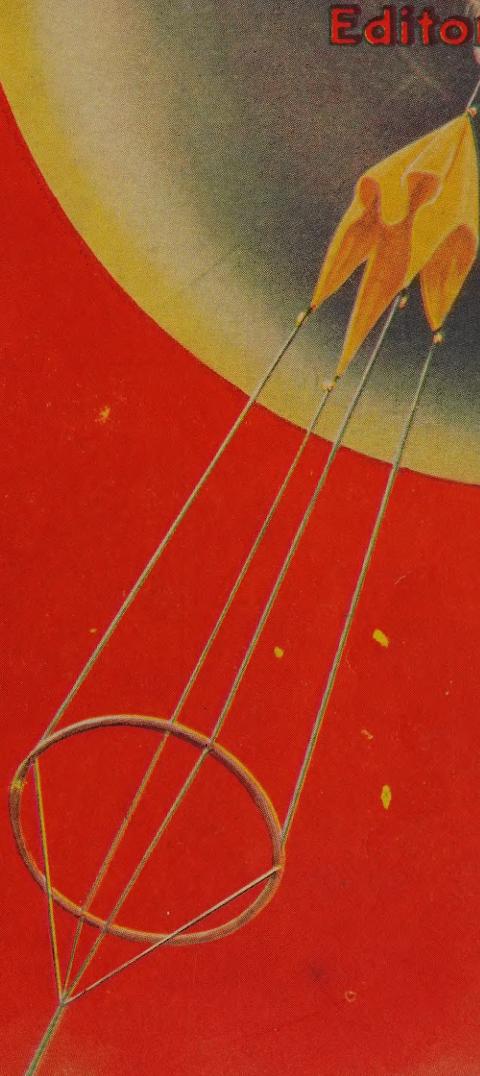
THE RADIO EXPERIMENTER'S MAGAZINE

HUGO GERNSTBACK
Editor

SHORT WAVE AND TELEVISION

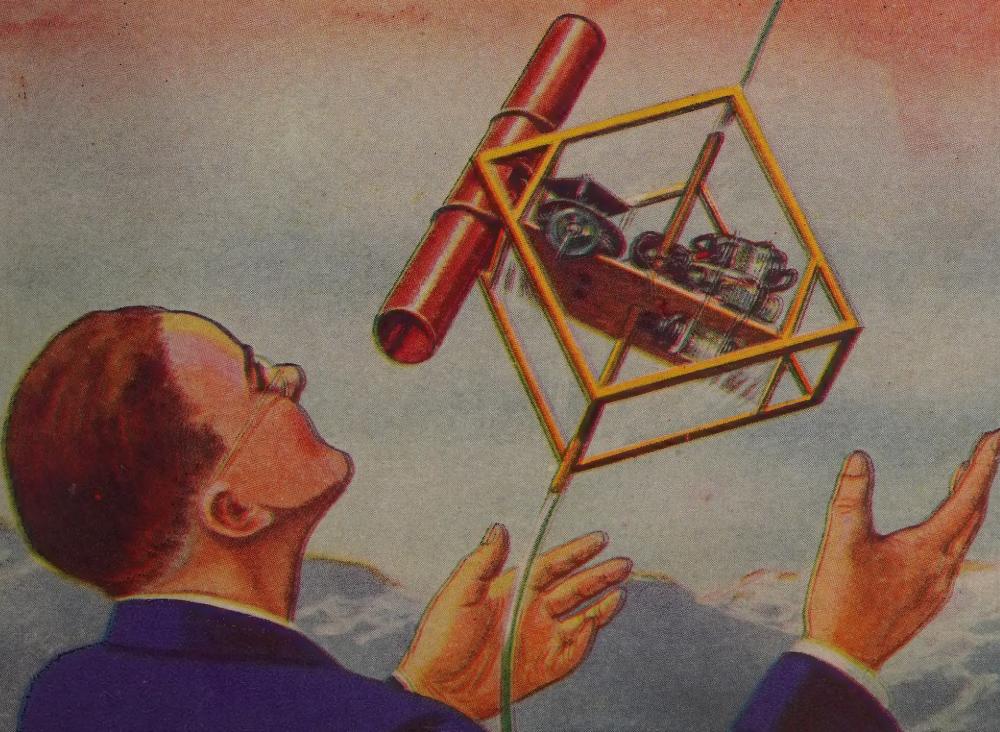
July 37

WORLD'S
LARGEST
SHORT WAVE
CIRCULATION



Short-Wave
Weather Balloon

See Page 118



25c
IN U.S. AND CANADA

RCA ALL
THE WAY

RCA Radio News

RCA Manufacturing Company, Inc. • Camden, New Jersey
A Service of the Radio Corporation of America

EVERYTHING IN
RADIO-MICROPHONE
TO LOUDSPEAKER

To the consumer, RCA means high quality performance at low cost...To the radio man, RCA means easier selling, higher profits

ENJOY NEW RADIO THRILL!

*Thousands Getting New Pleasure
from Radio that's RCA All The Way!*

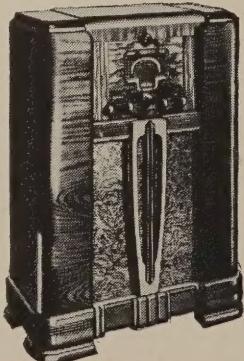
The air is full of thrills! Every hour of every day finds colorful, exciting programs being broadcast for you to hear—to enjoy!

As fine as these programs are—it's up to you to get the thrill of radio that's RCA All the Way—perfect performance beginning with the RCA microphone in the studio and coming to you with equal perfection from your RCA Victor receiver. Only by owning an RCA Victor radio can you get this thrill.

They Cost as Little as \$20

You can enjoy radio that's RCA All the Way at low cost with one of RCA Victor's new 1937 models! They are now on display at your RCA Victor dealer's store. Designed for every purse they cost as little as \$20. Among the many models priced below \$100 are several with RCA Victor's Magic Brain, Magic Eye, Metal Tubes. Every chassis is housed in a beautiful cabinet—and there is a large variety of cabinet styles—one of which is sure to catch your eye. At slightly higher prices are the fine models which feature RCA Victor's latest triumph—the Magic Voice.

But visit your dealer. See and hear these superb radios. Take particular notice of their thrilling performance. Then match them against any other radios of equal price—and RCA will win you!



RCA Victor Console Model 9K3 . . . with Magic Voice, Magic Brain, Magic Eye, Metal Tubes. 530 to 22,000 kcs. Beam Power Amplification, Selector Dial, 9 tubes, \$134.95.

New Tube Manual!

The RC-13 Manual on RCA Radio Tubes gives service men complete information on all receiving tube types including Metal and G-Series tubes. Get your copy from your RCA tube distributor.

RCA Radiotron Check-up Restores Radio's Pep and Power

Radios, like anything else that's constantly in use, eventually tire and lose the efficiency which gave you outstanding performance when the set was new.

You can restore your radio's original pep and power—give it new life and "new set" tone by having your radio service man administer the cure-all of an RCA Radiotron check-up.

This check-up consists of 10 testing, cleaning and adjusting steps which cost you only \$1.50.

Get More Service Jobs— Push the Check-Up

If you're a service man you will discover, as hundreds of other men in your business have, that the RCA Radiotron Check-up Plan not only gives you additional service jobs but in addition, helps you sell parts, new sets and other appliances that you have for sale.

You will find the RCA check-up an easy service to sell. Because there's nothing unusual about check-ups in American life. People are accustomed to check-ups of all sorts. They know the value of check-ups. Therefore, a radio check-up is quite acceptable.

You get selling help, too, direct from RCA Radiotron. For full column advertisements are running in the Saturday Evening Post and Collier's every other week . . . newspaper ads are appearing in over 100 cities . . . the check-up is being featured with commercial announcements on a full hour Sunday radio program. And in every one of these advertising efforts RCA Radiotron is featuring *you* as the man to perform this check-up service. In addition, RCA Radiotron also offers you mailing pieces for your own use—mailing pieces that will include your own name and address and which will bring you directly to the attention of all your prospects. Secure yours today. Use them. Get behind this check-up service—and profit! You can get full details from your jobber, who will also be glad to tell you about the new RCA Radiotron Auto Radio Check-up.

This is P. A. Time— The Time to Cash In!

Warm weather and bright sunshine are here. And that means it's P.A. time—and the time for you to cash in on installations of public address systems.

Your prospects? There are many. This season of the year is ideal for outdoor installations such as in amusement parks, athletic fields, camps, resorts, swimming pools and "garden" night clubs.

The best way for you to get your share of this P.A. business is to offer prospects RCA equipment. Public address systems bearing the RCA trademark provide real quality. And that's only natural. For behind them are the years of experience RCA has gained as the world's leading maker of sound products.

RCA offers these portable P.A. models that will cover all your needs for the type of equipment. Both give you the sales advantage of the RCA name. All are literally packed with performance features that help make them easy to sell. All sell at modest cost—yet assure you good profits.

Get after the P.A. market today. Get your share of the profits that are in it. Push the RCA public address systems shown here—and win many installation jobs! Write us for free details.



RCA Portable Sound System PG-98 . . . provides volume for audiences up to 1600 persons. 12 watts. RCA Velocity Microphone. Two Electro Dynamic Speakers. Easily accessible controls. Comes complete with six RCA Radiotrons.



RCA Portable Sound System PG-62-E . . . provides volume for audiences up to 3,000 persons. 20 watts. RCA Velocity Microphone with adjustable banquet stand. Two special Electro Dynamic Speakers. Provides for mixing voice with musical background. Comes complete with seven RCA Radiotrons.

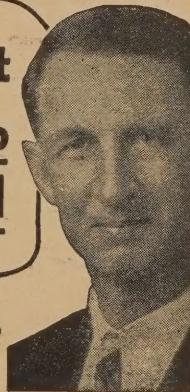
In addition to these two systems shown above, RCA also offers another Portable Sound System, the PG-63-B—a 6-watt system providing volume for audiences up to 600 persons.

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. . . . I will train you to start
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service business Without Capital

**Many Radio Experts Make
\$30, \$50, \$75 a Week**



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\$3,500 a Year in Own Business

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I'll prove that my Training is practical, money-making information, that it is easy to understand—that it is just what you need to master Radio. My lesson text, "Radio Receiver Troubles—Their Cause and Remedy" covers a long list of Radio receiver troubles in A. C., D. C., battery, universal, auto, T. R. F., superheterodyne, all-wave and other types of sets. And a cross reference system gives you the probable cause and a quick way to locate and remedy these set troubles. A special section is devoted to receiver check-up, alignment, balancing, neutralizing and testing. Get the lesson Free. No obligation. Just mail coupon.

Do you want to make more money? The world-wide use of Radio sets has made many opportunities for you to have a spare time or full time Radio service business of your own. Three out of every four homes in the United States have Radio sets which regularly require repairs, servicing, new tubes, etc. Many sets are old and will soon be replaced by new models. I will train you to sell, install, service all types of Radio sets—to start your own Radio service business and build it up. Mail coupon for my 64-page book. It's FREE.

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Mail the coupon now for my Lesson on Radio Servicing Tips and my book, "Rich Rewards in Radio." Both are free to anyone over 16 years old. My book describes Radio's place in Television; tells about my Training in Radio and Television; tells about my Money Book Agreement; shows you actual letters from men I have trained, telling what they are doing and earning. Find out what Radio offers YOU! MAIL THE COUPON ON THIS ENVELOPE, or paste it on a penny postcard—NOW!

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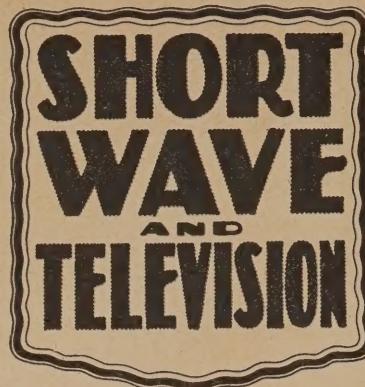
MAIL THIS. Get a Lesson and 64 page book FREE

IN THIS ISSUE: PROMINENT SHORT-WAVE AND TELEVISION AUTHORS

Goldsmith • Peterson • Metz • Shuart • Kahlert • Miller • Perrine

HUGO GERNBSACK

Editor



Combined With Official SHORT WAVE LISTENER

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An Effective Short-Wave Pre-Selector, by Raymond P. Adams

Getting The "Best Results" From Your S-W Receiver, by H. W. Secor

The "Surface Wave" In Radio Transmission—Does It Exist?

Television—Latest News and Pictures

A Message From Baron Manfred Von Ardenne, Europe's famous television expert

And all the usual features.

H. WINFIELD SECOR

Managing Editor

GEORGE W. SHUART,
W2AMN

Associate Editor



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SHORT WAVE & TELEVISION is the only magazine that certifies circuits and sets.

OUR COVER

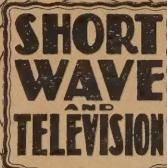
• Short waves are a great aid to our weather experts, and our cover illustration this month shows one of the weather balloons, which carries an ultra-short-wave transmitter. These balloons are released in different parts of the country and they radio back to a ground receiving station, important data on the conditions of the upper atmosphere. This information proves extremely valuable to our weather forecasters. Read all about it on page 118.

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Televisual Use of Ultra-High Frequencies

Dr. Alfred N. Goldsmith
Consulting Industrial Engineer

● SCIENCE moves in cycles its wonders to perform! The first method of producing images was that of the optician. This is the most nearly perfect form of color television of which we know. In every camera, light waves coming from considerable distances are caused to form a colored image on a photographic film or plate. The great industries of motion-picture and still-picture photography have been built up around this type of "television." The wavelengths used are extremely short—in fact, much shorter than we shall probably be able to generate and modulate by any direct electrical means which are now foreseeable. The wavelength is about half a thousandth of a millimeter and the hyper-super-ultra-high frequency of these light waves is about half a billion megacycles!

Long distance radio—and even broadcasting—started out by using fairly long waves, hundreds or thousands of meters in length. The "center of interest" in radio has continually shifted toward the *short* waves. Starting with the 10,000- or 20,000-meter transatlantic communication waves of 10 or 15 years ago, there was a gradual shift toward waves between 100 and 1000 meters in length. These were most popular when broadcasting originated and largely determined our present technique in that field. Then the waves from 10 to 100 meters engaged the attention of all who were concentrating on *long-distance* telegraph or telephone communication, and gave a tremendous impetus to progress by commercial organizations and *amateurs* alike. More recently—in fact, within the last few years—the pioneers have explored the domain from 1 to 10 meters (that is, from 300 to 30 megacycles). These ultra-high frequencies are clearly a sort of intermediate stage between the long waves of radio "antiquity" and the light waves which enable us to see and which are the basis of optics, photography, and picture projection. It is but natural that the *televisual* use of ultra-high frequencies should be promising. The ultra-high-frequency waves are short enough to be transmitted with great steadiness under any conditions, and their frequency is sufficiently high to prevent the Kennelly-Heaviside layer from reflecting them (except, perhaps, very occasionally). Here is a *steady* and *high-quality* medium of communication. Further, their frequency is sufficiently high to permit television modulation to be carried out accurately and with-

out too many electrical circuit problems.

The first question facing the television experimenter is: Shall I use 30-megacycle (10-meter) waves or 300-megacycle (1-meter) waves for television? The lower frequency has some real advantages. These waves pass over the average city with less absorption and are more readily generated by efficient and available tubes. However, they have the disadvantage that they are more prone to jump over long distances, thus causing interference in remote localities and complicating greatly the problem of frequency allocation by governmental authorities. They are also more susceptible to natural static than are the higher frequencies in this band.

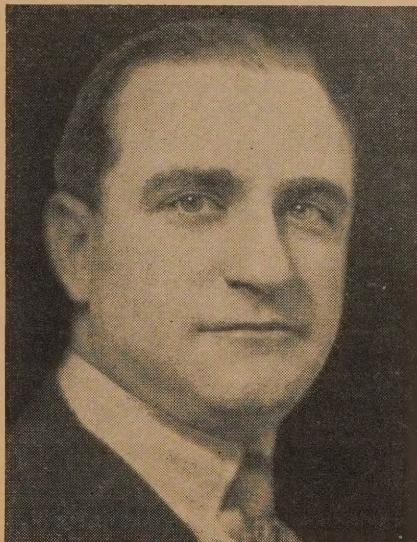
These higher frequencies (closer to the 300-megacycle region) have the advantage that they are less open to natural static or even man-made interference and that they can be more accurately radiated in given directions or regions by small reflecting antenna systems. They also have the advantage of a controllable and limited range which makes them suitable for easy regional allocation. But they have the disadvantage that it is difficult to generate much energy efficiently on these extraordinarily high frequencies and that the absorption of these waves, even in smaller towns or open country, is high. In fact, "line-of-sight" transmission is practically essential for these high frequencies.

It is probably best to use the lower end of this ultra-high-frequency band for television, at least for local service in the immediate future. It then becomes possible to cover metropolitan areas twenty or thirty miles in radius with a considerable degree of reliability. Interference from automobile ignition

systems and medical diathermal equipment will be encountered, but can be reduced or eliminated by orderly campaigns with public support. The television picture which is transmissible on these frequencies is probably of sufficiently high quality to have continuing entertainment value and to satisfy the public. It may be added that sound programs (that is, telephone broadcasting) of *extremely high fidelity* is also possible on these frequencies. All in all, the recommendation of the radio industry to the Federal Communications Commission that the ultra-high-frequencies from 42 to 90 megacycles (excluding the amateur band from 56 to 60 mega-

(Continued on page 141)

Dr. Alfred N. Goldsmith, Consulting Engineer;
Past President, Institute of Radio Engineers,
and The Society of Motion Picture Engineers.



Seventh of a Series of "Guest" Editorials

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RADIO • TELEVISION • COAXIALS

WHAT an A. T. & T. Co., Engineer Has to Say

An Interview with—

Dr. J. O. PERRINE

Associate Editor of the Bell System Technical Journal,
American Telephone and Telegraph Company

By H. W. SECOR

Dr. J. O. Perrine has aided in the publication of technical papers relating to the development and utility of Transoceanic Radio Telephony. In this capacity he is in a good position to give us what may be considered the latest picture of the situation in this field, and the problems connected with its daily operation; also some of the things we may expect from the new inter-city coaxial cable. He was a captain in the Signal Corps during the World War, and was senior technical officer in the Signal Corps Officers' Training School. Associated with radio and high-frequency phenomena for many years, he now takes the role of spokesman for the many research and operating men associated with radio telephony in the Bell System. Dr. Perrine is also one of the foremost lecturers on science and communication.

- Overseas telephony on a thorough-going commercial basis has just passed its tenth birthday and is well on its way toward further extension and development. During this infancy stage we have, with great admiration, watched it grow and seen its service extended to country after country and to the various ships at sea, until at present more

than 93 per cent of the telephones of the world are within reach of a United States subscriber. During this past decade we have seen experimental voice channels set up on a two-way basis from airplanes to ships at sea; and on April 25, 1935, an interconnection of wire lines and three radio (short-wave) channels was set up in tandem, which created a two-way circuit that went completely around the world. Over this round-the-world circuit Mr. Walter S. Gifford, President of the American Telephone and Telegraph Company, talked with Mr. Theodore G. Miller, vice-president of the same company, between two rooms atop the Long Distance building at 32 Sixth Avenue, New York City. The conversation was conducted back and forth with practically the same ease as that over a local connection. Distance has been annihilated, time has been shortened, and the world brought closer together.

Let us reflect a bit at this point. We know that there are good and bad radio days. Some days it is possible for radio amateurs to reach great distances on short waves with relatively small amounts of power, and then there are days when nothing seems to get through. Some days long distances are reached only for short intervals of time. In giving a communication service to the public, it must be on a 24-hour basis every day, seven days a week, etc. Ample power must be utilized to get the message through, regardless of conditions. The telephone company, in adherence to its policy that the message must get through if possible, has utilized every technological facility and improvement available for its circuits. In the field of broadcasting, the transmitter is interested



Dr. J. O. Perrine

in reaching as many listeners as possible; accordingly, its waves are allowed to spread out in most all directions, somewhat like a table lamp in your living room. A communication channel, on the other hand, is interested in having its transmitters reach only certain desired receivers; hence its waves are usually concentrated as much as is economically possible in a given direction, somewhat like a searchlight. The antennae systems of the radio transmitters are therefore made highly directional, and thus renders the energy that moves into space more effective. At the receivers of the communication channel, the use of highly directive antennae helps to mitigate noise and interference from the unwanted directions and improves greatly the signal-to-noise ratio.

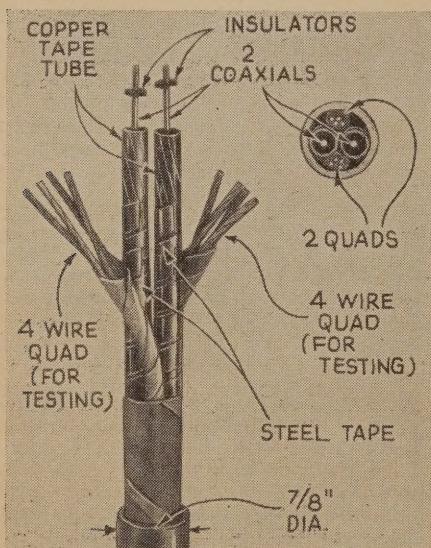
Thousands of visitors to the Long Distance building at New York and the outlying radio stations have been awed and thrilled to see the telephone plant in actual operation.

There is perhaps no one better fitted to tell us of some of the problems met with, than Dr. J. O. Perrine.

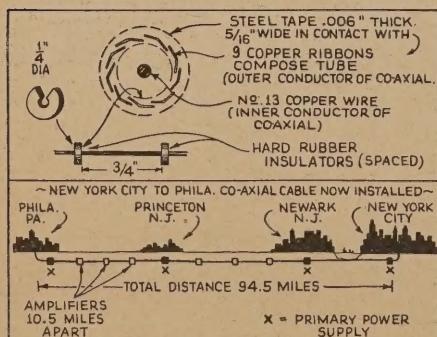
Early Experiments—First Transoceanic Phone

"Dr. Perrine," I asked, "How long has the A. T. & T. Company been interested in long-distance radio telephony?"

"Let me see now," replied Dr. Perrine. "Our engineers have been experimenting (Continued on page 150)



A section of the twin coaxial cable installed between New York and Philadelphia, a distance of about 94 miles.



Diagrams above show how copper tube is built up, also "repeater" system between New York and Philadelphia.

The New York terminal of the coaxial cable in the "Long-Lines" Building at 32 Sixth Avenue, New York City. Photo Bell Telephone Labs.



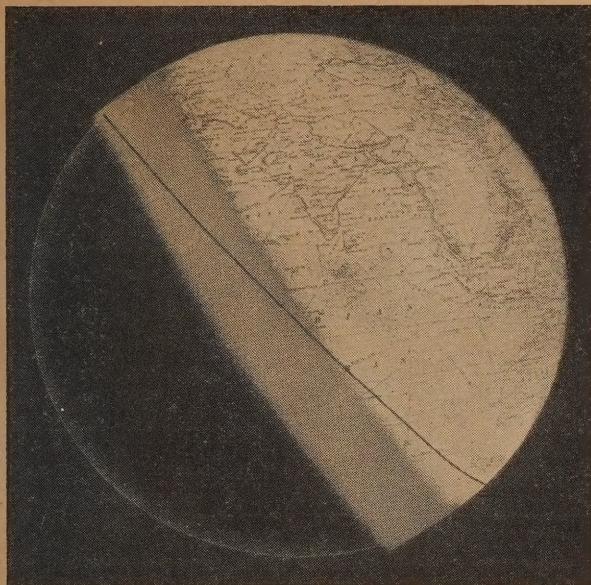
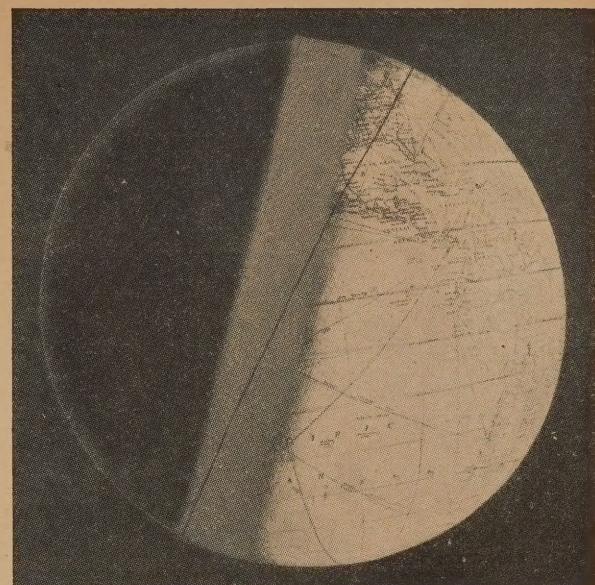


Fig. 3-A —
Conditions at
1:30 a.m.
Greenwich time on
June 21.

Fig. 3 —
Lighting conditions for the position of the earth at 1:30 p.m. Greenwich Mean Time for December 21.

Photos courtesy Bell Telephone Labs.



Around-the-World RADIO ECHOES

By A. C. Peterson, Jr.,

Radio Transmission Development, Bell Telephone Laboratories

• SINCE the earliest experiments with long wire telephone circuits, echoes have been a source of annoyance. They are normally caused by the reflection of energy at impedance irregularities along the transmission path. In radio transmission, where the signal energy is confined only by the earth and the ionosphere, echoes are caused by the signal arriving at the receiver after travelling over different paths. Since these paths may differ considerably in length, there is a corresponding difference in the time of arrival of the signals, and thus the effect on reception is similar to that of echoes caused by reflection on wire lines.

Radio waves passing between two points on the earth follow great circle paths, that is, paths lying wholly in a

plane determined by the two points and the center of the earth. For any two points which are not diametrically opposite each other there is only one such plane, but there are two directions that a radio signal can take in passing from one point to the other. This is illustrated at the left of Figure 1 for transmission from London to New York. One path extends westerly from London in the great circle plane, and the other follows a reverse track around the earth in an easterly direction from London. The direct signal, having much the shorter distance to travel, reaches New York first, while the reverse-path signal, travelling farther, arrives later, and appears as an echo.

Besides these two paths in opposite directions there are also echo paths due

to signals passing the receiver, completely encircling the earth one or more times, and being received again on each transit at a diminishing intensity. A signal may start easterly from London, reach New York, and then continue on around the world one or more times before it becomes inaudible. Such echo paths are illustrated in the center of Figure 1. A signal may also start westerly from London, and after reaching New York continue on around the world as indicated at the right of the illustration. From the point of view of the receiver, echoes fall into two groups: one group, called front around-the-world echoes, reaches the receiver from the same direction as the direct signal; the other group, including the reverse-path (Continued on page 146)

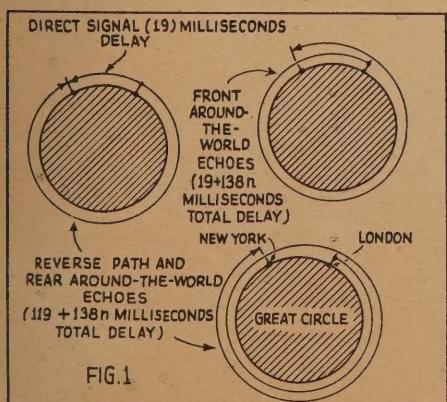


Fig. 1—A radio signal from London to New York may cause an echo by travelling around the world in either a westerly or an easterly direction, and in either direction it may encircle the earth one or more times.

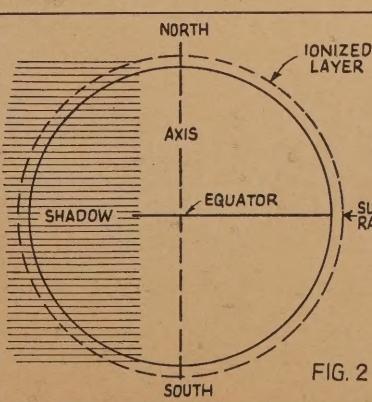


Fig. 2—One-half of the surface of the earth is always illuminated by the sun, but at an altitude of 150 kilometers, (90 miles) the illumination extends about 12 degrees beyond the illuminated surface of the earth, as shown above.

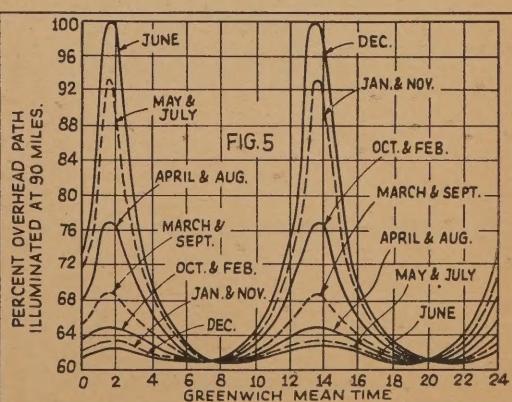
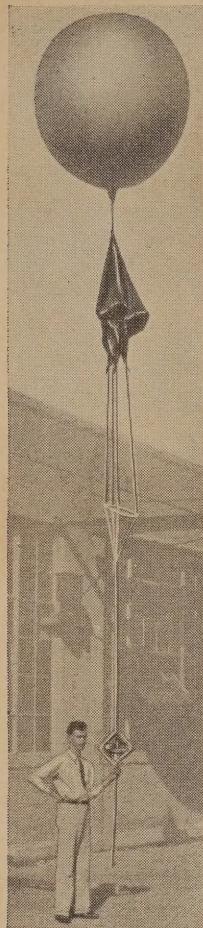


Fig. 5—Percentage illumination of the around-the-world great circle path from London to New York for various months of the year.

Short-Wave Weather Balloons

Provide Data On Upper Atmosphere



● ONE of the latest devices to help determine the weather conditions in the upper atmosphere is the featherweight short-wave transmitter here illustrated. This newest type radiometeorograph was developed under the direction of Dr. L. F. Curtiss, physicist of the National Bureau

light the filaments of the tubes.

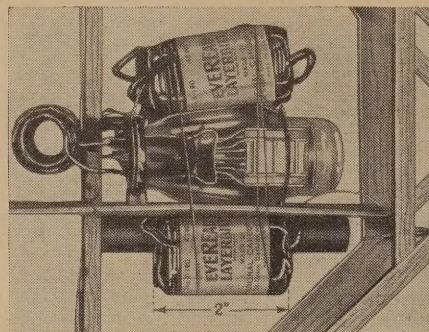
One of the newest features is the lightest weight 45-volt "B" Battery ever designed and built. These batteries are shown in the photos and were developed by a prominent American battery manufacturer; they are even smaller than the 30-type tubes; a very fine tribute to our battery designing engineers.

The balloon transmitter is keyed by a tiny electric motor weighing but 27 grams (less than 1 ounce) and it sends out signals regularly every 15 seconds. In between these fixed radio signals occur the signals which indicate air pressure, temperature and humidity. These signals are very short so that the

Left—One of the hydrogen-filled weather balloons ready to be released. Tiny 5-meter transmitter is shown secured to the tail of the balloon.

of Standards, at Washington, D. C., and through whose courtesy we are enabled to provide this data.

One of the accompanying diagrams shows the push-pull transmitter circuit used for the featherweight balloon sets. This circuit utilizes two 30-type tubes, and they are connected in push-pull. As Dr. Curtiss points out, these tubes were selected because of their low cost (in the event that the transmitter is not recovered) and also due to their low filament drain. This is a very important item as becomes apparent, as only a small battery can be provided to



This picture shows the two 30-type tubes which are connected in a push-pull circuit, together with the newest type miniature 45-volt "B" batteries.

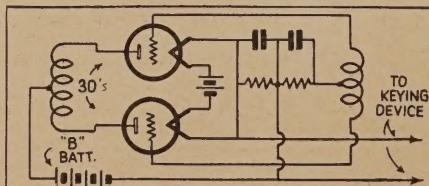
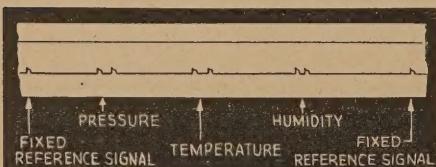


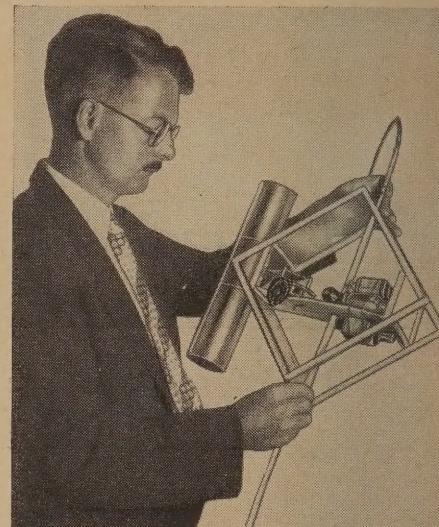
Diagram of the 5-meter transmitter is given above.



The special super-regenerative receiver used at the ground station to record the signals from the balloons; the recorder is shown at the left of the picture.



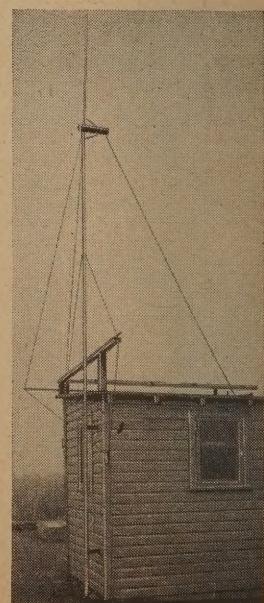
A typical chart, as recorded by the apparatus shown above, is here reproduced. By the sequence of signals the experts are able to interpret them to read varying degrees of air pressure, temperature and humidity.



Dr. L. F. Curtiss holding featherweight "balloon" transmitter.

mendous distance over which the signals from the tiny, extremely low-power balloon transmitter have been received—100 miles! Equally interesting is the fact that signals have been recorded from the balloons at an altitude as great as 24 miles (127,000 ft.).

The method of using the balloons is rather novel. The balloon, the size of which is seen from the photograph, is filled with hydrogen gas and the balloon is closed. At the maximum altitude to which the balloon ascends it bursts, and this factor, of course, will vary with the condition of the air, etc. When the balloon bursts the tiny radio transmitter is carried to earth by a parachute, to prevent damage to persons or objects on the earth at the point of landing. Dr. Curtiss states that it is hopeful that in the near future that these short-wave balloon transmitters can be made so cheaply that it will not be worthwhile to attempt their recovery in good condition.



A typical "ground" receiving station where the 5-meter signals from one of the balloon transmitters is picked up and automatically recorded. A vertical half-wave doublet is employed.

transmitter is off most of the time.

The type of receiver used at one of the ground stations is quite interesting. Contrary to expectations it is not of the superheterodyne type but of the super-regenerative pattern. This receiver is arranged to work a special pen recorder and one of the typical reception charts is reproduced on this page. The notches on the continuous line across the chart show where the various balloon signals are received, and as the chart moves at a given time rate and has besides a time graph recorded on the chart, the reception of the signals is accurately clocked.

The antenna used for receiving the balloon signals is a 5-meter half-wave doublet mounted in a vertical position. The exact frequency used is 55 megacycles, or 5.4 meters. The most astonishing fact of all perhaps, is the tre-

EYE and EAR "Signals"

Tell Pilot He Passed Beacon

By H. I. Metz

Assistant Airways Engineer, Bureau of Air Commerce

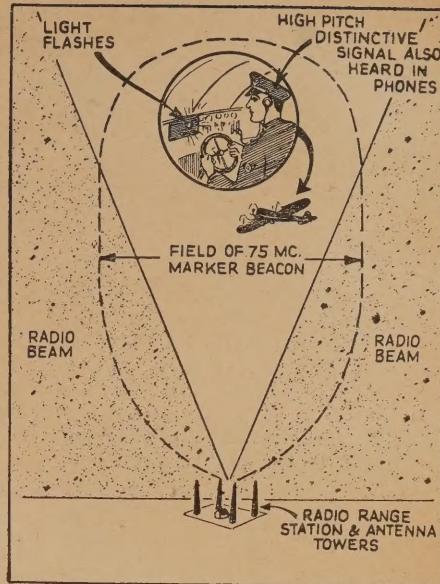
The latest ultra-short wave beacons devised by the Bureau of Air Commerce utilizes a high-pitched signal radiated vertically on a wavelength of 3.9 meters. As the pilot passes over a radio range-beacon he receives two signals: one—a flashing light, and the other a high-pitched aural signal which he hears in his headphones.

• A RELIABLE beam of radio energy directed skyward and supplementing the familiar "cone of silence" of a radio range beacon has been recently developed by the Bureau of Air Commerce. Development work on this vertical beam, known as a "Z marker," has been in progress in the field and laboratories of the Bureau by the radio development section under the direction of William E. Jackson, chief of the section for several years. Recent advances have produced exceptional results.

Trial installations of the latest equipment have been made at Chicago, Kansas City, Newark, and Washington, the Washington installation being reserved for further testing of numerous refinements. The new installations operate on a frequency of 75 megacycles (3.99 meters) with 3,000 cycle modulation. All of the original trial markers, which operated on 91 megacycles with 60-cycle modulation, have been shut down.

The special 6 1/4 pound airplane receiver developed by the Bureau to utilize these marker signals provides both aural and visual indication for the pilot. The aural signal is obtained by connect-

ing the audio output of the new marker receiver in parallel with the output of the regular range receiver. The pilot, in flying the regular range signal, hears the marker signal superimposed on the range signal as the ship passes over the range station. It becomes audible slightly before the ship passes into the



This diagram shows how the 3.9 meter or 75 mc. "Cone of Silence" radio marker signal is radiated by the special transmitter here described, causing both an "aural" as well as a "visual" signal to notify the pilot that he has just passed a range beacon.

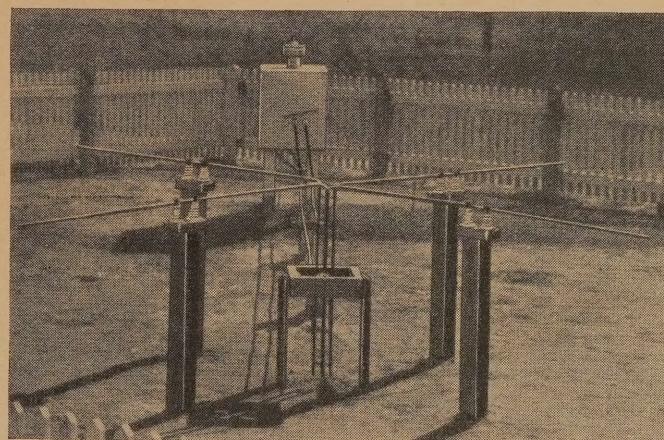


Fig. 3—Shows the transmitting antenna array used for radiating the vertical "Cone of silence" marker signal.

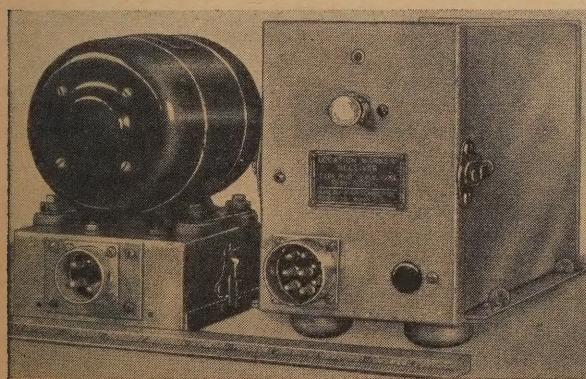


Fig. 1—Here is the extremely light-weight airplane receiver designed for picking up the "Cone of Silence" marker signal.

usual "cone of silence," and increases rapidly to a predetermined maximum loudness. The maximum signal strength remains constant for a considerable period, depending upon speed and altitude, and then fades away. Being of high pitch, the marker signal causes no interference in reception of range signals.

The visual signal is a standard 12-volt white

is a simple detector and audio amplifier consisting of a 954, a 6F7, and an 85 tube. The output circuit contains a 3,000-cycle band pass filter to avoid erroneous indications. Other circuit details are shown in the diagram, figure 2. These characteristics were measured with a G. R. type 604B signal generator adjusted for 30 percent modulation. The sensitivity was 460 microvolts, and can be varied from a maximum of about 300 microvolts by adjustment of the tap on the detector grid coil.

Several Types Tried

Several types (Continued on page 142)

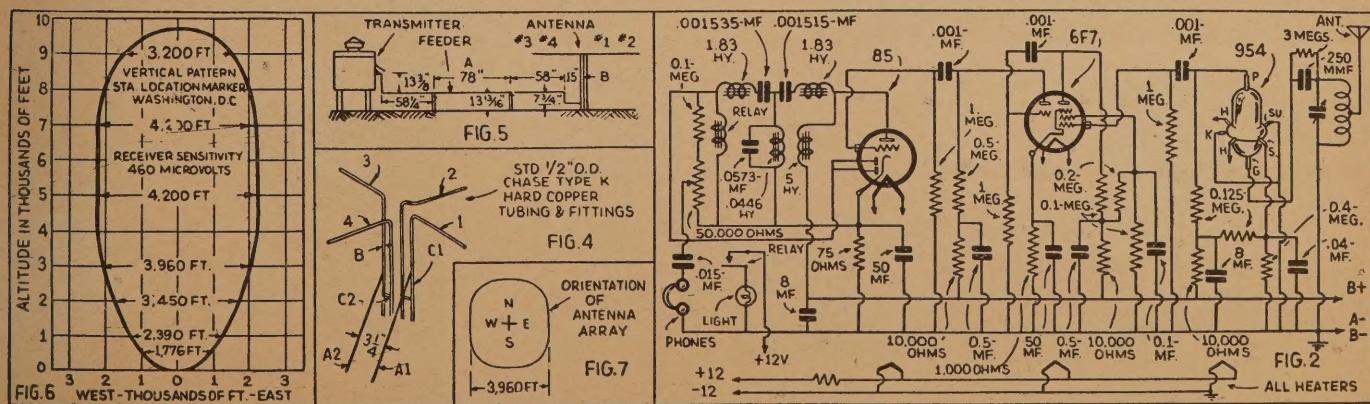
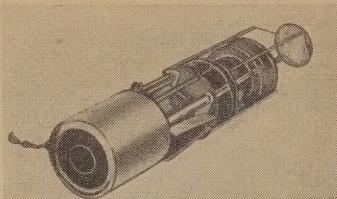


Fig. 2—Shows diagram of 75 mc. receiver with relay for flashing light signal. Fig. 3—Arrangement of transmitter, feeder and antenna. Fig. 4—Vertical wave patterns of 75 mc. signal. Fig. 5—Arrangement of transmitter, feeder and antenna. Fig. 6—Horizontal pattern of a signal at 3,000 ft. observation level.

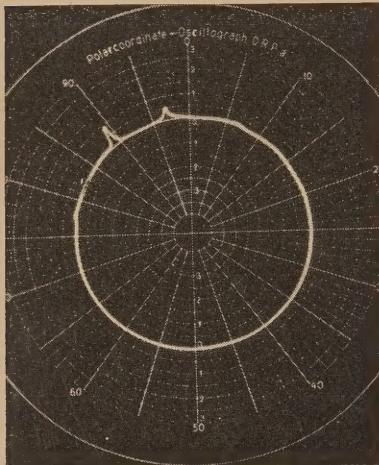
5-Meter Waves Visible With New Cathode Ray Tube

• A NEW cathode ray tube with an entirely new method of beam deflection has recently been developed in Europe and is at present the most discussed subject among engineers and scientists abroad. The operation of this new device stands for something entirely new in the field of cathode ray tube application and design, and reminds one of a cross-breed between an electric-motor and a cathode ray tube.

The main principle of the new device is the combination of two deflection plates with a pair of coils; the latter are, of course, installed outside the tube. The two plates mentioned are placed direct-



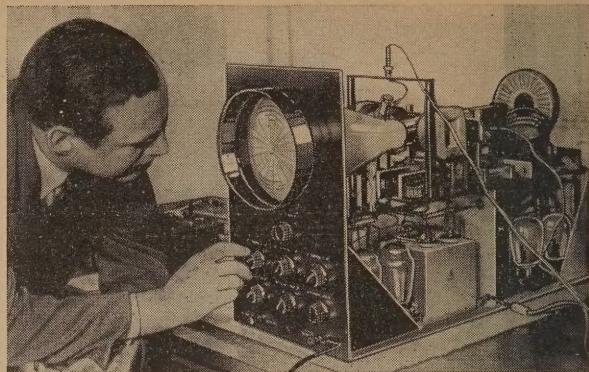
Above—the special concentric cone electrode which is used to provide radial deflection.



When the beam enters the space between the two plates something strange happens; it is thrown out of its regular path of straight forward propagation, and is forced to rotate in a circular form.

But this is not the only obstacle placed into path of the beam. After it has passed the *motor-combination* (consisting of the two plates mentioned and a pair of coils) which forces the beam to *rotate*, it is confronted with a *cone-condenser* of co-axial design. The beam must pass through this condenser before it can reach its final target, namely the fluorescent screen.

While passing the co-axial condenser, the beam is "pulled up and down," of course in a radial direction, i.e., from the center axis of the tubes towards the wall and vice versa. (Continued on page 149)



Baron Manfred Von Ardenne shown with his newest invention—a cathode ray oscilloscope which has a circular rotating beam.

Extreme left—typical oscilloscope showing two impulses separated about 7 millionths of a second.

ly in the propagation path of the cathode ray beam, which is produced as usual in the neck of the tube. It is thrown out of its regular path of straight forward propagation, and is forced to rotate in a circular form.

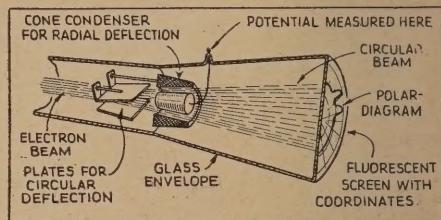
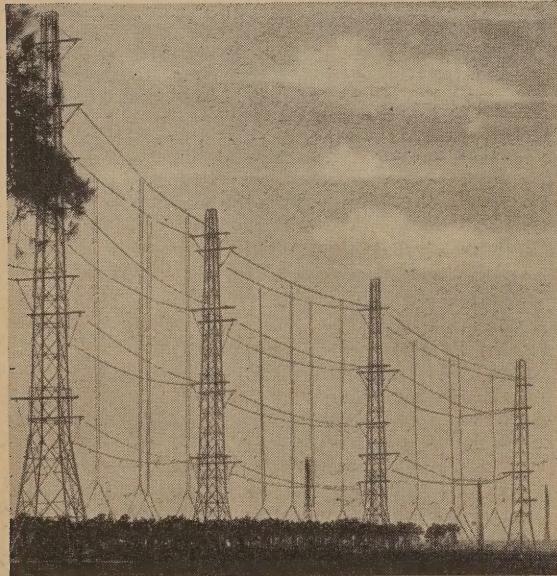


Diagram showing how cathode ray is deflected by electro-static cone condenser.

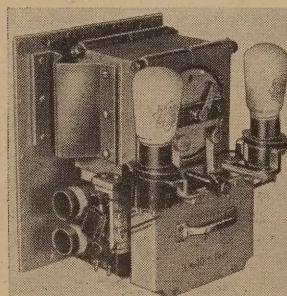
BEELITZ—Where Germany Picks Up Overseas S-W "Sigs."

permits the operator to use any combination of aerials desired. Three receivers can be operated from each antenna set-up. The central photo shows one of the interchangeable oscillators which can be handled the same as a plug-in coil; the one shown has a range of 10 to 14 meters.

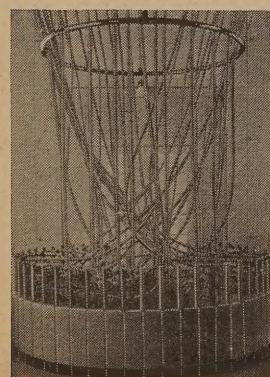
One of the photos shows an ultra-short-wave receiver of the type used for short-wave reception from America. It uses 24 tubes and it is air, gas, and water-tight, and also will withstand vibration caused by air attacks. The apparatus shown has been designed by the famous "Telefunken" engineers.



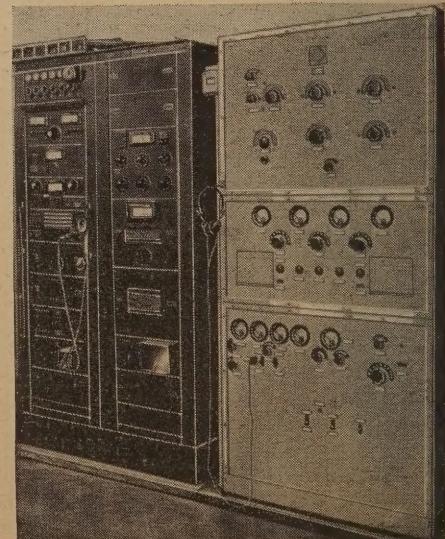
Above—View of some of the antennas at the German short-wave receiving station at Beelitz, near Berlin. A "reflector" is used behind the aerial. Left—Giant antenna switch controlling the connections of three receivers and 40 directional aerials.



Above—Photo shows one of the interchangeable local oscillators for 10 to 14 meters range. Right—Appearance of one of the air and water-tight trans-Atlantic receivers, which uses 24 tubes. Receivers are also vibration proof.



• THE accompanying photos show some interesting views of the newest short-wave receiving equipment at Germany's trans-Atlantic receiving station located at Beelitz, near Berlin. The large photo at the left, shows part of the elaborate short-wave antenna system; 40 aerials similar to the one shown being installed around the receiver building. Each aerial section between two towers has 16 dipoles. Behind each antenna there is a reflector, and these two can be interchanged by an elaborate switching system shown in the lower left-hand photo. Push-button control



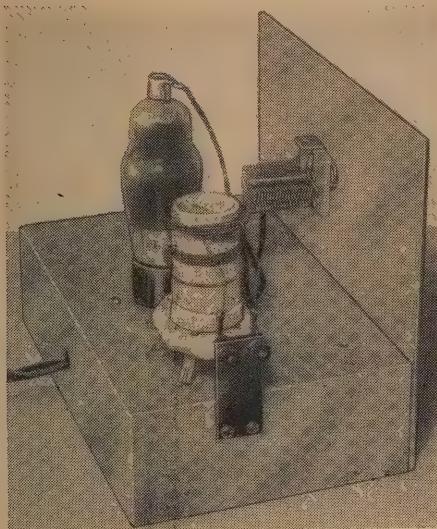
Short-Wave Beginner

SIMPLE 1-TUBE BOOSTER

AIDS "DX" FAN

By George W. Shuart, W2AMN

Did you ever attempt to tune in a distant short-wave station, and finally give up in disgust, because your set could not bring in the voice loud enough? This very simple 1-tube booster will solve the problem for you, and greatly increase the range of the average short-wave receiver.



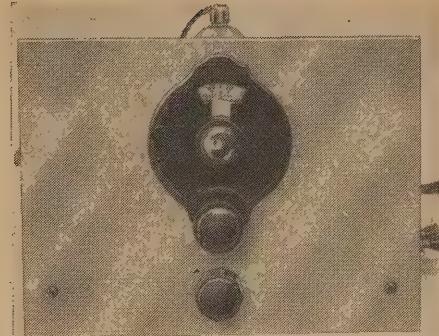
A rear view of the "weak signal" booster.

• THERE are undoubtedly many short-wave "fans," amateurs, or experimenters who now possess receivers which can well make use of additional amplification. The booster or preamplifier about which we are presently concerned offers a method of improving the operation of certain types of receivers in many ways. For instance, the main advantage is in the additional amplification made possible through its use. The greatest difference will be noticed in the strength of the very weak signals. Also there will be a somewhat better ratio of signal-to-noise. In certain types of superheterodynes the addition of the preselector of this type goes a long way toward reducing, or eliminating images. Then again, receivers not provided with coupling arrangements suitable for doublet antennas will benefit in that a doublet may easily be used with this instrument.

The main consideration was whether or not regeneration should be used in the booster. The addition of regeneration provides an extra control, however, its cost is very small and its addition provides greatly increased selectivity and sensitivity. In fact, the regeneration control may be set at a point where it need not be changed over the entire tuning range of the booster or it may be adjusted to a more critical point for maximum sensitivity. The flexibility in this regard favored its being incorpo-

rated. The method of obtaining regeneration is via the conventional cathode tap commonly referred to as electron coupling.

In the photograph we note that the antenna coupling coil is mounted so that it may be varied with respect to the grid coil. This adjustable coupling is really essential for maximum efficiency. In the diagram we find that there are two methods of coupling this booster to the present receiver, that is, the one



The 1-tube R.F. booster viewed from the front.

ones are shown in the diagram; one is a half-wave doublet with spaced feeders. The other employs a twisted pair for feeders or lead-in. The twisted lead-in arrangement is more convenient, although its electrical operation is not as flexible as the other. The spaced feed-line will provide a wider frequency response than the twisted pair, inasmuch as a condenser may be employed to tune the spaced line.

In another sketch, we have shown the Zeppelin or single wire with antenna having spaced feeders at the end. Twisted feeders should not be used with this type of (Continued on page 148)

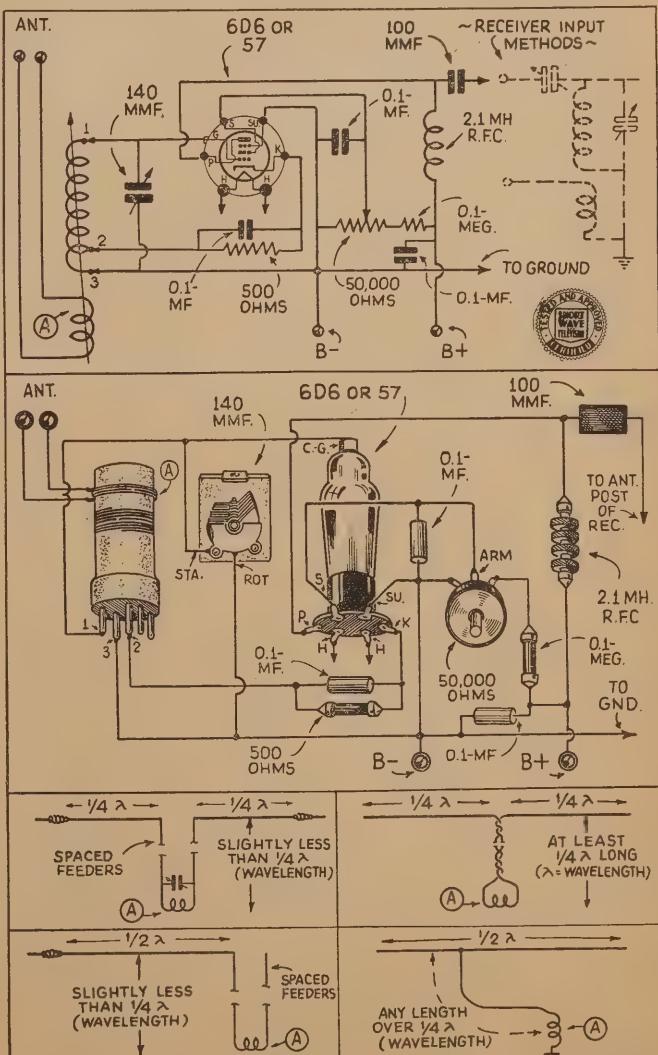
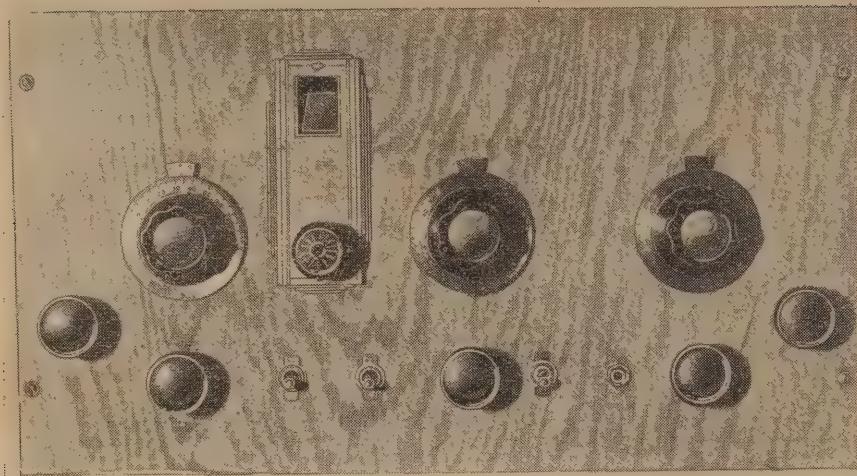


Diagram of pre-amplifier and improved antenna connections.

The SUPER-10 • A Receiver

By P. Kemle



Front view of the Super-10 receiver.

IN these days of such excellent commercial type Ham receivers for sale at prices just about equal to the cost of parts, it may be asked why anyone should want to build his own set. A commercial receiver may bring in foreign stations one hundred per cent, but the greatest credit goes to the man who receives a goodly number of "DX" stations on a completely "home-built" job.

The receiver about to be described was built with this feeling in mind, and while it may not outdo a manufactured receiver, its performance leaves little to be desired, considering cost and home construction.

Numerous Controls Provided

The panel as may be seen in the photograph is fitted with controls for literally everything in the set. The main dial (drum-type) is located a little to the left of the center. The knob to the left of the main dial is the oscillator band-setting condenser; the knob to the right of the main dial is the first-detector band-setting condenser and the knob at the extreme right is the R.F. band-setting condenser.

The knobs at the extreme left and right are used as drawer handles where the chassis pulls out as a drawer, sliding at the bottom. It is necessary that the chassis pulls out for the exchange of the plug-in coils.

In the lower line of controls the one on the left, right below the oscillator control is the tone-control and A.C. switch. Below the main dial (drum) on the left is the B.F.O. switch; to the right the "stand-by" switch. Right below the first detector knob is the special audio control; to the right of it is the A.V.C. switch, then next the phone jack. Right below the R.F. knob is the R.F. "gain" control.

The panel measures 12 x 20 inches, made of three-ply fir veneer, finished like the rest of the cabinet and lined with a thin sheet of aluminum to eliminate hand-capacity.

The speaker is mounted right below the panel on a piece of Celotex 20 x 22

inches, 1 inch thick; the lower end is in line with the cabinet, while the top is 7 inches back, to give the Celotex panel a slanting position. The result is a wonderful improvement in quality, even with high "Q" iron core I.F. transformers.

Layout of Parts

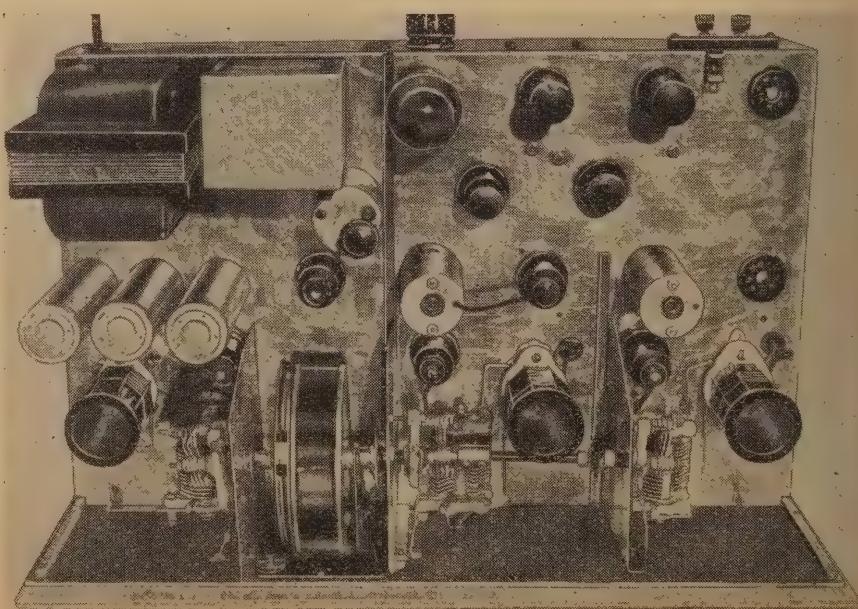
The chassis is 12 x 17 inches, 3/16 of an inch aluminum, 3 inches deep. The three shields dividing the three stages, oscillator, first-detector and R.F. are 1/16 of an inch aluminum. The single box at the left of the drum dial is the 6J7 oscillator. In the centre or to the right of the drum dial is the 6L7 first detector. On the extreme right is the 6K7 R.F. stage. Immediately behind the oscillator stage is the power-supply.

First the three filter condensers; at the extreme left hind corner is the power transformer; to the right of the power transformer is the filter choke; to the right of the choke is the 80 rectifier tube. Right behind the drum dial is the 6K7 B.F.O. tube; behind it the B.F.O. transformer. Immediately behind the first detector is the input I.F. transformer. To the right of it the 6K7 I.F. tube, and next the output I.F. transformer. In the centre line at the left the B.F.O. transformer. To the right of it the 6C5 first A.F. tube. Next to the right the 6H6 second detector. At the extreme back to the right of the 80 rectifier tube are the pair of 6F6's (second A.F.).

As you may notice there are two tube-sockets not used. They were originally intended for amplified A.V.C. but after I had the receiver working, it was so satisfactory that I left it out.

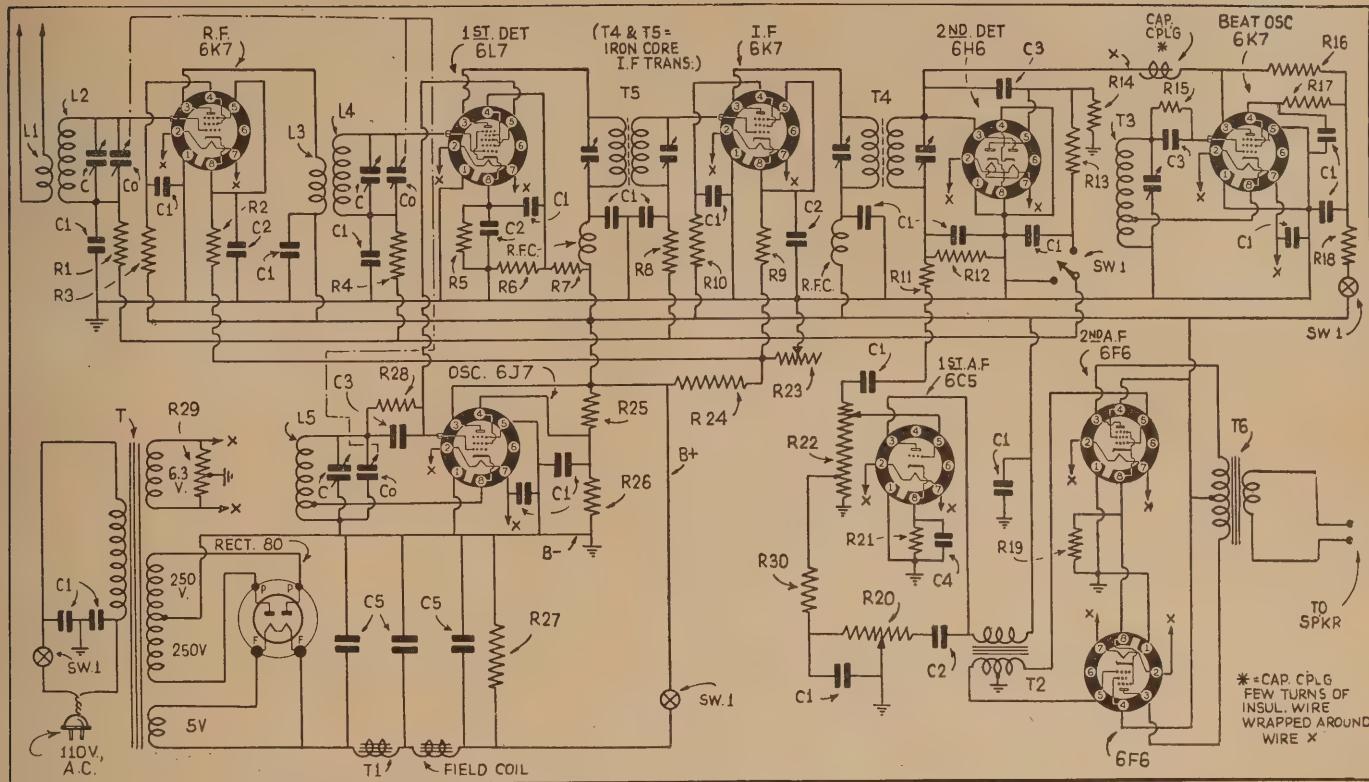
Plug-in Coils Used.

I have experimented at length and finally decided to stay with plug-in coils. Although the front panel may not be as modern as when a tuning unit is employed, it is more efficient and to an amateur, efficiency counts after all. I have all metal tubes, with the exception of the rectifier—which is glass—in order to keep the R.F. gain as high as possible. Metal tubes present two great advantages for the high frequency section of a superhet. First, there is the increased gain made possible by the improvement in design over glass. One advantage is the better shielding afforded. Second, is the employment of the 6L7 type tube for the first detector mixer. The 6L7 is probably the best "mixer" now available. Its use assures a high conversion gain of the first detector oscillator combination.



Chassis of the Super-19 receiver, showing shielding and layout of tubes, etc.

for the MAN Who Builds His Own



Wiring diagram of the "Super-10" receiver, which includes rectifier and filter.

The selectivity is taken care of by one stage of I.F. using modern iron-core I.F. transformers. The degree of selectivity thus obtained resembles a single-signal effect.

The second detector uses the popular 6H6 double diode tube. This tube, in addition to handling large inputs without distortion, makes possible the production of proper automatic volume control voltage for minimizing fading in the simplest manner. The beat-frequency oscillator when switched on produces a heterodyne whistle on all stations, which renders the location of weak phone or broadcast station easy. It is coupled from its plate with 7 turns (*insulated*) to the grid lead of the second I.F. transformer.

Audio Circuit—Head-phones

The Audio circuit is as simple as it is good, with a special taper control. A single 6C5 triode feeds through a high quality audio transformer to a pair of push-pull 6F6 power amplifier tubes.

Head-phone output is taken from the output transformer, the speaker being automatically disconnected when the phone plug is in circuit. This permits of "DX" hunting with a pair of earphones, without disturbing all the rest of the family. This feature is particularly useful late at night or early in the morning. (Jack not shown.)

In wiring the filament circuit should be done first; next all R.F. leads should be put in place. After that all by-pass condensers and resistors should be wired in.

The mounting bolt for each socket should have a soldering lug placed under its nut, and this lug used as the ground point for all by-pass condensers connected to the circuit of that particular tube. This gives *single-point grounding* for each stage, which is necessary for complete stability of all circuits. These grounding lugs can be soldered directly to the adjacent shield connections of the sockets. No. 16 solid tinned push-back (copper) wire was used throughout the receiver. No leads had to be shielded in the original receiver.

As can be seen in the top of chassis photo, the power-supply is "built in." Its condenser input is a 30 henry 150 ma. filter choke with the speaker field used. Both A.C. lines are by-passed by .01 mf. paper condensers. It is of importance that all parts be of very good quality. It will pay. First, better service. Second, longer service—with less trouble.

Tuning

By setting the band-setting condensers at the beginning of the band, the three band-spreading condensers coupled with the main dial (drum type) spreads the band over 50 to 70% of the dial.

This 10-tube receiver provides loudspeaker or head-phone reception on the principal bands. Other features are—continuous band-spread, built-in power supply, double-diode detector, beat-oscillator, plug-in coils for different bands, iron-core I.F. transformers, and the use of metal tubes—except the rectifier.

Line-Up

The I.F. transformers should be lined up with an oscillator if possible. Also a good job can be made if very careful lining up is done with an incoming signal.

The Cabinet

The cabinet is of the mantel type, very frequently seen over fire places. I found it very comfortable to have my books close at hand. Any handy man should be able to construct it. It is made of $\frac{3}{4}$ inch clear fir, 4 feet 8 inches long, 4 feet high and $1\frac{1}{2}$ inches deep, and has one door on each side. In the centre at the bottom is the speaker and above the panel with controls. There are two shelves on each side about 15 inches long. Cabinet is also home-made with the exception of doors. They are factory-made to fit opening 1 inch thick.

Legend

KENYON
T—Power Transformer
T1—30H 150 ma. Filter choke
T2—Push-pull "input" transformer
T6—"Output" transformer and speaker

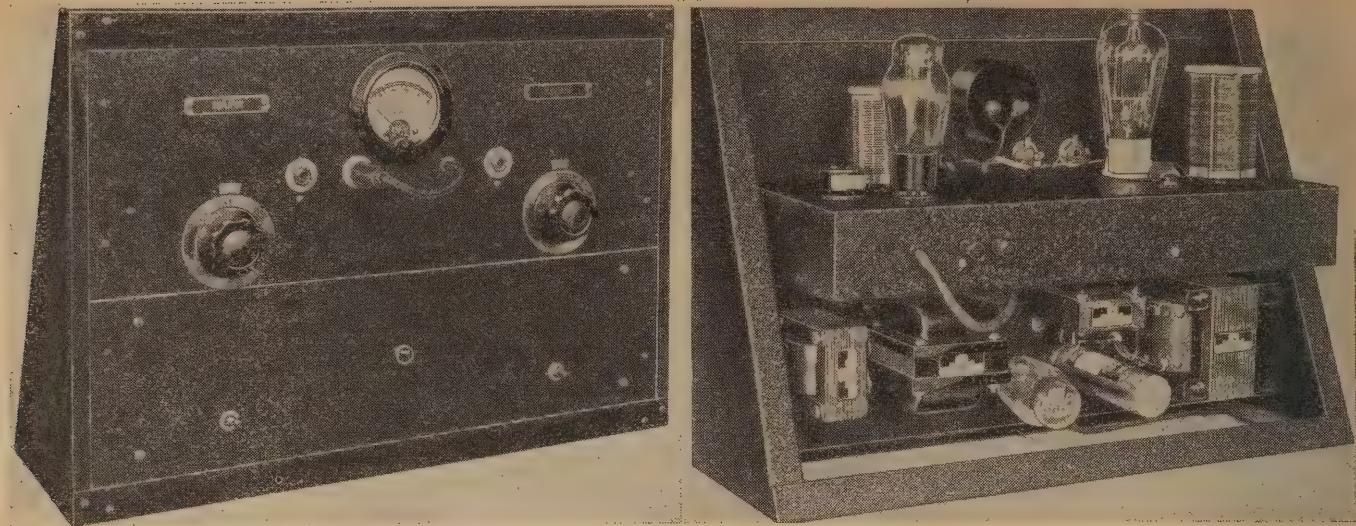
HAMMARLUND

T3—B.F.O. transformer 465 kc.
T4-5—Iron-core I.F. transformer, 465 kc.
C—100 mmf. Var. Cond.
CO—35 mmf. Var. Cond.

CORNELL—DUBILIER

C1—.01 mf. paper
C2—.1 mf. paper
C3—.0001 mf. mica
C4—10 mf. Electrolytics low voltage type
C5—8 mf. Electrolytics

(Continued on page 145)



Above—front view of the transmitter; it is crystal-controlled. Rear view appears at right.

40 Watt Transmitter for the "NEWCOMER"

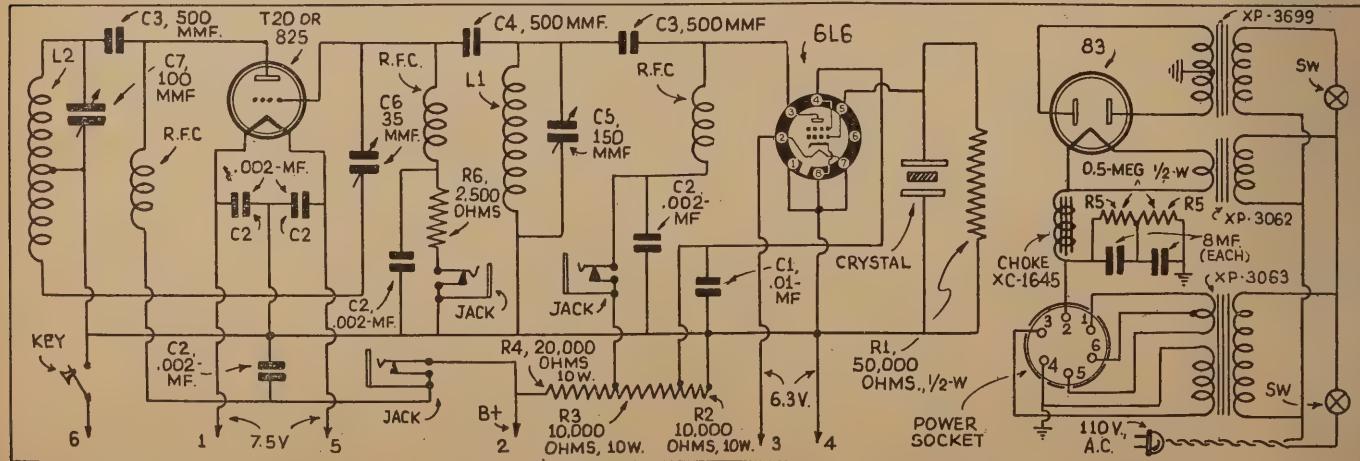
• THE greatest problem which faces the newcomer to "Hamdom" is the choice of his first transmitter, not so much due to the lack of material to choose from, but perhaps due to the multitude of various circuits and combinations, all of which undoubtedly have their good points.

Simplicity and efficiency should be the object in any case, and we believe the transmitter described in this article is an ideal one for the beginner. It consists of a tet-trode beam tube (6L6) oscillator driving a T-20 triode and the overall output is approximately 40 watts. It was primarily designed for 80 meter operation and complete data for that band will be given. However, by the choice of proper coils and a suitable crystal, this transmitter may be operated on either 160, 80 and 40 or 20 meter band.

Here is a "dandy" transmitter for the beginner—this set is available in "kit" form and full-size working drawings are supplied. It uses a T-20 or 825 and a 6L6, with crystal control. Power-supply is also described.

izing coil is tantamount to a separate coil inductively coupled to the plate coil. This method permits good electrical balance without the use of split stator condensers, thus reducing cost considerably.

The transmitter as shown in the photos consists of two units mounted in a convenient desk-type rack. The top unit is the entire R.F. portion, while the power-supply is located on the bottom panel. The layout presents a very neat and business-like appearance. There are three jacks located under the D.C. milliammeter. A plug from the meter permits it to be changed from the one circuit to another. One jack is used for reading the oscillator plate current, the other is used for measuring the amplifier grid current, and the third one is used for measuring the plate cur- (Continued on page 144)



Circuit diagram of the 40-watt transmitter.



World S-W Station List.

Complete List of Broadcast, and Telephone Stations

All the stations in this list use telephone transmission of some kind. Note: Station calls printed in bold face are broadcast stations; others are telephone stations.

Please write to us about any new stations or other important data that you learn through announcements over the air or correspondence with the stations.

↓ S.W. BROADCAST BAND ↓		Mc.	Call	Mc.	Call	Mc.	Call	
21.600	W3KEY	BALTIMORE, MD., 9.494 m., Relays WFBR 4 pm-12m.	19.620	VQG4	NAIROBI, KENYA, 15.28 m., Addr. Cable and Wireless, Ltd. Calls London 7.30-8 am.	17.755	ZBW5	HONGKONG, CHINA, 16.9 m., Addr. P. O. Box 200. 4-10 am. irregular.
21.600	W2XDV	NEW YORK CITY, 9.494 m., Addr. Col. Broad. System, 485 Madison Ave. Daily 5-10 pm.; Sat. and Sun. 12.30-5, 6-9 pm.	19.600	LSF	BUENOS AIRES, ARG., 15.31 m., Addr. (See 20.700 mc.) Tests irregularly.	17.741	HSP	BANGKOK, SIAM, 16.91 m. Works Germany 4-7 am.
31.600	W4XCA	MEMPHIS, TENN., 9.494 m., Addr. Memphis Commercial Appeal. Relays WMC.	19.480	GAD	RUGBY, ENG., 15.4 m. Calls VQG4 7.30-8 am.	17.650	XGM	SHANGHAI, CHINA, 17 m. Works London 7-9 am.
31.600	W8XAI	ROCHESTER, N. Y., 9.494 m., Addr. Stromberg Carlson Co. Relays WHAM 7.30-12.05 am.	19.355	FTM	ST. ASSISE, FRANCE, 15.5 m. Calls S. America mornings.	17.520	DFB	NAUEN, GERMANY, 17.12 m. Works S. America, near 9.15 am.
31.600	W8XWJ	DETROIT, MICH., 9.494 m., Addr. Evening News Ass'n. Relays WWJ 6-12.30 am., Sun. 8 am-12 m.	19.345	PMA	BANDOENG, JAVA, 15.51 m. Works Holland 5.30-11 am.	17.480	VWY2	KIRKEE, INDIA, 17.16 m. Works London 7.30-8.15 am.
31.600	W9XPD	ST. LOUIS, MO., 9.494 m., Addr. Pulitzer Pub. Co. Relays KSD.	19.260	PPU	RIO DE JANEIRO, BRAZ., 15.58 m., Addr. Cia. Radiotel Brasileira. Works France mornings.	17.120	WOO	OCEAN GATE, N. J., 17.52 m., Addr. A. T. & T. Co. Workships irregularly.
25.100	GSK	DAVENTRY, ENG., 11.49 m., Addr. B. B. C., London. Operates irregularly 5.45-8.55 am., 9.55 am.-12 n.	19.220	WKF	LAWRENCEVILLE, N. J., 15.6 m., Addr. A. T. & T. Co. Calls England daytime.	17.080	GBC	RUGBY, ENG., 17.56 m. Works ships irregularly.
25.950	WBXKG	LOS ANGELES, CAL., 11.50 m., Addr. B. S. McGlashan, Wash. Blvd. at Oak St. Relays KGFJ 24 hours daily.	19.200	ORG	RUYSSELEDE, BELGIUM, 15.62 m. Calls OPL mornings.	16.835	ITK	MOGADISCIO, ITAL. SOMALILAND, 18.32 m. Calls IAC around 9.30 am.
24.600	W9XAZ	MILWAUKEE, WIS., 12.19 m., Addr. The Journal Co. Relays WTMJ from 1 pm.	19.180	GAP	RUGBY, ENG., 15.66 m. Calls Australia 1-8 am.	16.270	WLK	LAWRENCEVILLE, N. J., 18.44 m., Addr. A. T. & T. Co. Works S. Amer. daytime.
21.550	GST	DAVENTRY, ENG., 13.92 m., Addr. (See 26.100 mc.) Irregular at present.	19.020	HS8PJ	BANGKOK, SIAM, 15.77 m. Mondays 8-10 am.	16.270	WOG	OCEAN GATE, N. J., 18.44 m., Addr. A. T. & T. Co. Works England Late afternoon.
21.540	W8XK	PITTSBURGH, PA., 13.93 m., Addr. Grant Bldg. Relays KDKA 7-9 am.	18.970	GAQ	RUGBY, ENG., 15.81 m. Calls S. Africa mornings.	16.240	KTO	MANILA, P. I., 18.47 m., Addr. RCA Comm. Works Japan and U. S. 5-9 pm. irregularly.
21.530	GSJ	DAVENTRY, ENG., 13.93 m., Addr. (See 26.100 mc.) 5.45-8.55 am., 9.15 am.-12N.	18.990	ZSS	KLIPHEUVEL, S. AFRICA, 15.88 m., Addr. Overseas Comm. of S. Africa, Ltd. Calls GAQ 9-10 am.	16.233	FZR3	SAIGON, INDO-CHINA, 18.48 m. Calls Paris early morning.
21.520	W2XE	NEW YORK CITY, 13.94 m., Addr. Col. Broad. Syst., 485 Madison Ave. Relays WABC 6.30-11 am.	18.830	PLE	BANDOENG, JAVA, 15.93 m. Calls Holland early am.	16.030	KKP	KAHUKU, HAWAII, 18.71 m., Addr. RCA Comm. Works Dixon 3-10 pm.
21.470	GSH	DAVENTRY, ENG., 13.97 m. (See 26.100 mc.), 5.45-8.55 am., 9.15 am.-12 m.	18.820	GAU	RUGBY, ENG., 16.11 m. Calls N. Y. daytime.	15.880	FTK	ST. ASSISE, FRANCE, 18.9 m. Works Saigon 8-11 am.
21.420	WKK	LAWRENCEVILLE, N. J., 14.01 m., Addr. Amer. Tel. & Tel. Co. Calls S. Amer. 7 am.-7 pm.	18.480	HBH	GENEVA, SWITZERLAND, 16.23 m., Addr. Radio Nations. Tests irregularly.	15.865	CEC	SANTIAGO, CHILE, 18.91 m. Calls Peru daytime irregular.
21.080	PSA	RIO DE JANEIRO, BRAZ., 14.23 m. Calls WKK daytime.	18.345	FZS	SAIGON, INDO-CHINA, 16.35 m. Works Paris early morning.	15.810	LSL	BUENOS AIRES, ARG., 18.98 m., Addr. (See 21.020 mc.) Works London mornings and Paris afternoons.
21.080	WKA	LAWRENCEVILLE, N. J., 14.25 m. Addr. (See 21.420 mc.) Calls England morning and afternoon.	18.340	WLA	LAWRENCEVILLE, N. J., 16.36 m., Addr. A. T. & T. Co. Calls England daytime.	15.660	JVE	NAZAKI, JAPAN, 19.16 m. Works Java 3-5 am.
21.020	LSN6	BUENOS AIRES, ARG., 14.27 m., Addr. Cia. Internacional de Radio. Works N. Y. C. 7 am.-7 pm.	18.310	GAS	RUGBY, ENG., 16.38 m. Calls N. Y. daytime.	15.620	JVF	NAZAKI, JAPAN, 19.2 m. Works Cal. near 5 am. and 8 pm.
20.860	EHY-EDM	MADRID, SPAIN, 14.38 m., Addr. Cia. Tel. Nacional de Espana. Works S. Amer. mornings.	18.299	YVR	MARACAY, VENEZ., 16.39 m. Works Germany mornings.	15.450	IUG	ADDIS ABABA, ETHIOPIA, 19.41 m. Works Rome 9.15-10.30 am.
20.700	LSY	BUENOS AIRES, ARG., 14.49 m., Addr. Transradio Internat. Tests irregularly.	18.250	FTO	ST. ASSISE, FRANCE, 16.43 m. Works S. America daytime.	15.440	XEBM	MAZATLAN, SIN., MEX., 19.43 m., Addr. Flores 103 Alto. "El Pregonero del Pacifico." Irregularly 7 am.-10 pm.
20.380	GAA	RUGBY, ENG., 14.72 m. Calls Arg., Brazil mornings.	18.200	GAW	RUGBY, ENG., 16.48 m. Works N. Y. C. daytime.	15.415	KWO	DIXON, CAL., 19.46 m., Addr. A. T. & T. Co. Works Hawaii 2-7 pm.
20.040	OPL	LEOPOLDIVILLE, BELGIAN CONGO, 14.97 m. Works ORG mornings.	18.135	PMC	BANDOENG, JAVA, 16.54 m. Works Holland mornings.	15.370	HAS3	BUDAPEST, HUNGARY, 19.52 m., Addr. Radiolabor, Gyali Ut 22. Sun 9-10 am.
20.020	DHO	NAUEN, GERMANY, 14.99 m., Addr. Reichspostzentralamt. Works S. Am. mornings.	18.115	LSY3	BUENOS AIRES, ARG., 16.56 m., Addr. (See 20.700 mc.) Tests irregularly.	15.360	DZG	ZEESEN, GERMANY, 19.53 m., Addr. Reichspostzentralamt. Tests irregularly.
19.900	LSG	BUENOS AIRES, ARG., 15.08 m., Addr. (See 20.700 mc.) Tests irregularly.	18.040	GAB	RUGBY, ENG., 16.83 m. Works Canada morning and afternoon.	15.355	KWU	DIXON, CALIF., 19.53 m., Addr. A. T. & T. Co. Phones Pacific Isles and Japan.
19.820	WKN	LAWRENCEVILLE, N. J., 15.14 m., Addr. A. T. & T. Co. Calls England daytime.	17.810	PCV	KOOTWIJK, HOLLAND, 16.84 m. Works Java 6-8 am.			
19.800	CEC	SANTIAGO, CHILE, 15.24 m., Addr. Cia. Internacional de Radio. Calls Col. and Arg. daytime.						
19.650	LSN5	BUENOS AIRES, ARG., 15.27 m., Addr. (See 21.020 mc.) Calls Europe daytime.						
↓ S.W. BROADCAST BAND ↓		17.790	GSG	DAVENTRY, ENG., 16.86 m., Addr. B. B. C., London. 5.45-8.55 am., 9 am.-12 n., 12.20-3.45, 4-6, 6.20-8.30 pm.	15.340	DJR	BERLIN, GERMANY, 19.56 m., Addr. Br'dcast'g House, 8-9 am., 4.50-10.45pm.	
						15.330	W2XAD	SCHENECTADY, N. Y., 19.56 m., Addr. General Electric Co. Relays WGY 10 am. to 6 pm.
			17.785	JZL	TOKIO, JAPAN, 16.87 m. Tests irregularly.	15.310	GSP	DAVENTRY, ENG., 19.6 m., Addr. (See 26.100 mc.) 6.20-8.30 pm.
			17.780	W3XAL	BOUNDS BROOK, N. J., 16.87 m., Addr. Natl. Broad. Co. 6.30 am.-6.30 pm.	15.290	LRU	BUENOS AIRES, ARG., 19.62 m., Addr. El Mundo. Irregular
			17.770	PHI	HUIZEN, HOLLAND, 16.88 m., Addr. (See PHI, 11.730 mc.) Daily except Wednesday, 8-9.30 am.; Sun. 7-10 am.	15.280	HI3X	CIUDAD TRUJILLO, D. R., 19.63 m. Relays HTX Sun. 7.40-10.40 am. Weekdays 12.10-1.10pm.
			17.760	DJE	BERLIN, GERMANY, 16.89 m., Addr. Broadcasting House. 12.05-5.15 am.; 5.55-11 am. Sun. 11.10am.-12.25 pm.	15.280	DJQ	BERLIN, GERMANY, 19.63 m., Addr. Broadcasting House. 12.05-5.15, 6-8, 8.15-11 am., 4.50-10.45 pm.
			17.760	W2XE	NEW YORK, N. Y., 16.89 m., Addr. Col. Broad. System, 485 Madison Ave. 11 am.-12 n.	15.270	W2XE	NEW YORK CITY, 19.65 m., Addr. (See 21.520 mc.) 12 N-6 pm.

(Continued on page 181)

Hats Off, Boys! Here's a Live "YL" Shack—From Budapest

Editor, SHORT WAVE & TELEVISION:

Herewith a photo of my "shack." Should the picture and the description prove satisfactory, I shall be glad to see them published in *Short Wave & Television*. I should imagine that they would prove interesting to the amateurs in your country. I am the first licensed Hungarian YL (young lady operator), and to the present time, the only one. I have been a short wave amateur since 1932, and contacted six continents this September. I am now going to send my cards for my CW WAC (worked all continents) "certification." I work on 7 and 14 mc. amateur bands, and have many good "W" (U.S.) radio friends. I would be very glad to make a QSO with a W-YL. The description of my "shack" follows:

In the center of the table is my short-wave receiver (Schnell O-V-2, with a range from 16 to 200 meters) with the loudspeaker on top of it. Next to the receiver is my microphone and the little doll, Zsuzsika, hi!

Under the flowers is my 2-tube broadcast receiver which has a range of 200 to 600 M. On the right, on the little table, is my C.O.P.A. xmitter and the wavemeter.

I work with 25 watts on 7,195 and 14,390 kc. with crystal control. However, when the QRM is bad and I find it necessary to QSY, I can only do so with the P.A. operated as a push-pull T.P.T.G. oscillator on other frequencies.

On the wall you can see my call letters, QSL cards, the map, and to the right the splendid QSL card of station W3VJ from Salisbury, Md.

I work as a radio operator in Budapest's official station, where I can work with commercial stations of New York (Mackay). My full QRA is at present: Kisfaludy u. 22. Budapest. I will now say very 73 to all, W-YL's and OB's and hope to meet you "on the air" often.—Lenke Tischler, HAF1YL, Radio Amateur Station, Kisfaludy-u. 22., Budapest, Hungary.



(Fine! Lenke! Let's hear from more of the YL's. Don't be bashful girls, step right up and show us those photos of your "rigs." —Editor.)

He Finds the "Electro-dyne" Tops!

Editor, SHORT WAVE & TELEVISION:

I have just finished the *Electro-dyne* short-wave receiver originally described in the May, 1934, issue of *Short Wave Craft* magazine, but more elaborately described in the subsequent June issue.

This *Electro-dyne* receiver is absolutely the best short-wave set that I have ever built. Its sensitivity is astounding—its volume is amazing, and its DX ability is a revelation! That electron-coupled detector makes the *Electro-dyne* receiver the acme of circuit perfection.

However, I have made some improvements on the set which have brought out the very best there is in an already wonderful circuit. These improvements are all ideas which have appeared in various issues of "S. W. C." and I simply incorporated them in the *Electro-dyne*.

I use an audio choke in the detector plate circuit, instead of the original resistor, and this increases the gain considerably. Because the choke more nearly matches the plate impedance of the screen-grid tube and allows the full plate voltage to the tube, which is necessary if full amplification is to be derived from the 32 detector. Also, I built an extra stage of audio. A 30 type tube follows the detector. This makes a total of three audio stages. The detector tube must be shielded to prevent feed-back, which manifests itself in the form of a high-pitched whistle. (I shielded all of the tubes.) Not wanting to wind the filament choke, I used one of the 2.5 mh. size wound on the isolantite core. This choke makes it unnecessary to use any resistance in the filament of the detector—providing the "A" source is three volts. The resistance of the choke drops three volts to the required two. But a resistance is necessary in the filament circuit of the audio tubes, to prevent them from having the full three volts applied. I used a six-ohm rheostat. I substituted a .00005 mf. condenser for the .0001 mf. grid condenser of the original, and that really did the trick on the high frequencies!

I have received France, Germany, England, Spain, and several other foreign stations with full earphone volume—on two feet of antenna!

Many, many thanks to *Short Wave & Television* magazine for this splendid little receiver.

OLIE W. HUDSON,
415 Chandler St.,
Topeka, Kansas.

(Glad you like the "Electro-dyne," Olie, and let's know how you make out with some of our new set designs.—Editor.)

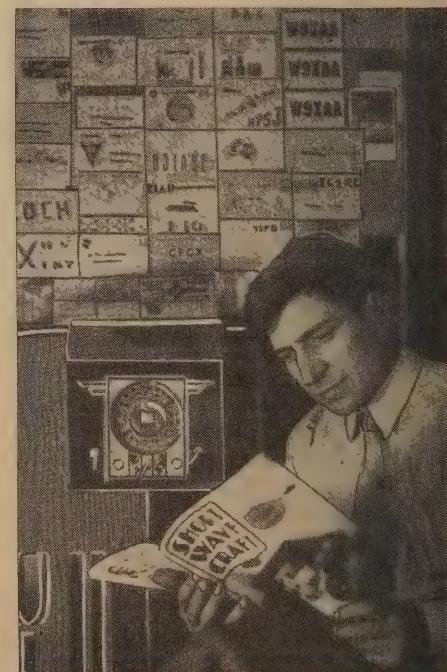
He Wants to Win S.W. Scout Trophy

Editor, SHORT WAVE & TELEVISION:

I am sending you a photo of my "listening post." My receiver is an 18-tube Midwest. I have purchased this set in April, 1936, and since that time I have been reading your magazine. I have purchased other radio magazines but I like your *Short Wave & Television* much better than the others.

Here's hoping that I'll be lucky enough to win your monthly prize.

I have started to "log" as many stations as possible in 30 days—May 15th to June 14th. I hope to win a "Trophy." I have sent out 108 letters and now have 48 veris in my possession. The stations are very slow in sending verifications.—Henry Sroka, 1507 Noble St., Chicago, Ill.



Henry Sroka, Chicago, Ill., enjoys his 18-tube "Midwest" receiver. He's after that S-W Scout Trophy—here's wishing you luck!



From "The Land of the Rising Sun"

Editor, SHORT WAVE & TELEVISION:

This is my official short wave listening post in the "Land of the Rising Sun." It is a Patterson PR-16C communications receiver—best receiver in Japan! The antenna is 15 ft. vertical and one end is 31 ft. above the ground. The location is very good and it is on the hill looking down upon the beautiful "Shiranui-Sea."

Total of 1,589 stations were heard on dynamic speaker, hi! hi! (All phone stations, only 1 CW) I have heard Russia, Philippine Islands, Java, Sumatra, Celebes, China, Manchukuo, Siam, France, U.S.A., Spain, Australia, Buenos Aires, Cuba, Dominican Republic, Venezuela, Chile, Porto Rico, Mexico, Canada, Hawaii, Japan, Hongkong, Korea, Alaska, Italy, England, Formosa, and India. There were many other stations heard, but I could not identify them. I also heard and received a veri from the new experimental station HS8PJ in Siam, hi!

I would like to exchange SWL cards with the listeners across the beautiful sea. I have, at present, 103 "pen pals" abroad. I am a member of the I.B.C., R9LL, and S.W.L.; and an ardent reader of *Short Wave & Television*.

My best DX on 20-meter amateur phone (from Japan) is W6JYH in Los Angeles. Just imagine! QSA5R4-5 on dynamic. I forgot to tell you that this picture is only one part of my room. I am in Hawaii now, so please send all SWL cards to the following address.—O. I. Noda, 817 Sheridan St., Honolulu, Hawaii.

Mc.	Call	DAVENTRY, ENG., 19.66 m., Addr. (See 26.100 mc.) 12.20-3.45, 9-11 pm.	Mc.	Call	BUENOS AIRES, ARG., 20.69 m., Addr. (See 21.020 mc.) Works RIO and Europe daytime.	Mc.	Call	KOOTWIJK, HOLLAND, 24.88 m. Tests irregularly.
15.260	GSI	TACHKENT, U.S.S.R., 19.67 m. Works RKI near 7 am.	15.500	LSM2	CARTAGO, COSTA RICA, 20.71 m. Works Central America and U. S.A. daytime.	12.060	PDV	MOSCOW, U.S.S.R., 25 m. Daily 3-6 pm., Sat., Sun., Tues., Thurs., 10.15-10.45 pm., also Sun. 6-11 am., Mon 6-7 am. and 8.30-9 pm. Wed. 6-7 am., Thurs. 8.30-9 pm.
15.252	RIM	BOSTON, MASS., 19.67 m., Addr. University Club. Sundays 11 am-12.30 pm. Irregular other days.	14.485	TIR	SAN SALVADOR, SALVADOR, 20.71 m. Irregular.	12.000	RNE	SAIGON, INDO-CHINA, 25.02 m. Phones Paris mornings.
15.250	W1XAL	PARIS, FRANCE, 19.68 m., Addr. 98 bis Blvd. Haussmann. "Radio Colonial." 5-10.05 am.	14.485	YSL	PANAMA CITY, PANAMA, 20.71 m. Works WNC daytime.	11.991	FZS2	CIUDAD TRUJILLO, D.R., 25.08 m., Addr. La Voz de Hispaniola. Relays HIX Tue. and Fri. 8.10-10.10 pm.
15.245	TPA2	BANGKOK, SIAM, 19.32 m. Irregularly Mon. 8-10 am.	14.485	HPF	GUATEMALA CITY, GUATEMALA, 20.71 m. Works WNC daytime.	11.960	HIZX	ADDIS ABABA, ETHIOPIA, 25.09 m. Works IAC around 12 midnight.
15.230	HS8PJ	HUIZEN, HOLLAND, 19.71 m., Addr. N. V. Philips' Radio, Hilversum. Tues. 4.30-6 am., Wed. 8-11 am.	14.485	TGF	NICARAGUA, MANAGUA, 20.71 m. Works WNC daytime.	11.955	IUC	BOLINAS, CALIF., 25.1 m. Tests irregularly evenings.
15.230	OLR5A	PITTSTURGH, PA., 19.72 m., Addr. (See 21.540 mc.) 9 am-7 pm.	14.485	YNA	MACAOME, HONDURAS, 20.71 m. Works WNC daytime.	11.950	KKQ	STE. ASSISE, FRANCE, 25.13 m. Works Morocco mornings and Argentina late afternoon.
15.220	PCJ	BERLIN, GERMANY, 19.74 m., Addr. (See 15.280 mc.) 12.05-5.15 am., 5.55-11 am., 4.50-11 pm. Also Sun. 11.10 am. to 12.25 pm.	14.470	WMF	TEGUCIGALPA, HONDURAS, 20.71 m. Works WNC daytime.	11.940	FTA	↓ S.W. BROADCAST BAND ↓
15.200	DJB	HUIZEN, HOLLAND, 19.71 m., Addr. N. V. Philips' Radio, Hilversum. Tues. 4.30-6 am., Wed. 8-11 am.	14.460	DZH	LAWRENCEVILLE, N. J., 20.73 m., Addr. A. T. & T. Co. Works England daytime.	11.900	XEWI	MEXICO CITY, MEXICO, 25.21 m. Monday, Wed. and Fri. 3-4 pm., 9 pm.-12 m. Tues. to Thurs., 7.30 pm.-12 m. Sat. 9 pm. to 12 m. Sunday 12.30-2 pm.
15.190	ZBW4	HONGKONG, CHINA, 19.75 m., Addr. P. O. Box 200. 11.30 pm. to 1.15 am., 4-10 am.	14.440	GBW	ZEESSEN, GERMANY, 20.75 m., Addr. (See 15.360 mc.) Irregular.	11.895	HP5I	AGUADULCE, PANAMA, 25.22 m., Addr. La Voz del Interior. 7.30-9.30 pm.
15.180	GSO	DAVENTRY, ENG., 19.76 m., Addr. (See 26.100 mc.) 12 M-2.15 am., 5.45-8.55 am., 4-6, 6.20-8.30 pm.	14.200	EASAH	RUGBY, ENG., 20.78 m. Works U. S. A. afternoons.	11.880	TPA3	PARIS, FRANCE, 25.23 m., Addr. (See 15.245 mc.) 4-5 am., 10.15 am-5 pm.
15.180	RW9E	MOSCOW, U.S.S.R., 19.76 m., Sun 2-3 pm.	13.990	GBA	TETUAN, SPANISH MOROCCO, 21.13 m. Daily except Sun. 2.15-5, 7 and 9 pm.	11.870	W8XK	PITTSTURGH, PA., 25.26 m., Addr. (See 21.540 mc.) 7-10.30 pm.
15.160	JZK	TOKIO, JAPAN, 19.79 m., 2.30-3.30 pm., 4-5 pm., 12 m-1 am.	13.820	SUZ	BOLINAS, CALIF., 21.91 m., Addr. RCA Communications. Irregular.	11.860	YDB	SOERABAJA, JAVA, 25.29 m., Addr. N. I. R. O. M. Sat. 7.30 pm. to 2.30 am., daily 10.30 pm. to 2 am.
15.150	YDC	BANDOENG, JAVA, 19.8 m., Addr. N. I. R. O. M. 6-7.30 pm. 10.30 pm-2 am., Sat. 7.30 pm-2 am., 5.30-10.30 am.	13.635	SPW	WARSAW, POLAND, 22 m., Mon., Wed. Fri., 12.30-1.30 pm.	11.860	GSE	DAVENTRY, ENG., 25.29 m., Addr. (See 26.100 mc.) Irregular.
15.140	GSF	DAVENTRY, ENG., 19.82 m., Addr. (See 26.100 mc.) 9.15-am-12 m., 4-6.9-11 pm.	13.585	GBB	RUGBY, ENG., 22.08 m. Works Egypt and Canada afternoon.	11.855	DJP	BERLIN, GERMANY, 25.31 m., Addr. (See 15.280 mc.) Irregular 11.35 am. to 4 pm.
15.120	HVJ	VATICAN CITY, 19.83 m., 10.30-10.45 am., except Sun., Sat. 10-10.45 am.	13.415	GCJ	RUGBY, ENG., 22.36 m. Works Japan and China early morning.	11.840	CSW	LISBON, PORT., 25.35 m. Nat'l Broad. Stat. 11.30 am-1.30 pm.
15.110	DJL	BERLIN, GERMANY, 19.85 m., Addr. (See 15.280 mc.) 12 m-2, 8-9 am., 11.35 am. to 4.30 pm. Sun. also 6-8 am.	13.410	YSJ	SAN SALVADOR, SALVADOR, 22.37 m. Works WNC daytime.	11.840	OLR4A	PRAGUE, CZECHOSLOVAKIA, 25.35 m. Daily 8.55 am. to 12 n., 2.25-4.30 pm. Sun. 2-7.30 am. Thurs. and Sat., 5-7.30 am. Mon. and Thurs., 7.55-11 pm.
			13.390	WMA	LAWRENCEVILLE, N. J., 22.4 m., Addr. A. T. & T. Co. Works England morning and afternoon.	11.830	W9XAA	CHICAGO, ILL., 25.36 m., Addr. Chicago Federation of Labor. Irregular.
15.090	RKI	MOSCOW, U.S.S.R., 19.88 m. Works Tashkent near 7 am.	13.380	IDU	ASMARA, ERITREA, AFRICA, 22.42 m. Works Rome daytime.	11.830	W2XE	NEW YORK CITY, 25.36 m., Addr. Col. Broad. System, 485 Madison Av., N.Y.C., relays WABC 6-9 pm.
15.055	WNC	HIALEAH, FLORIDA, 19.92 m., Addr. A. T. & T. Co. Calls Central America daytime.	13.345	YVQ	MARACAY, VENEZUELA, 22.48 m. Works WNC daytime.	11.820	XEBR	HERMOSILLA, SON., MEX., 25.38 m., Addr. Box 68. Relays XEBH. 2-4 pm., 9 pm.-12m.
14.980	KAY	MANILA, P. I., 20.03 m., Addr. RCA Comm. Works Pacific Islands.	13.285	CGA3	DRUMMONDVILLE, QUE., CAN., 22.58 m. Works London and ships afternoons.	11.820	GSN	DAVENTRY, ENG., 25.38 m., Addr. (See 26.100 mc.). Irregular.
14.970	LZA	SOPHIA, BULGARIA, 20.04 m., Addr. Radio Garata. Sun. 12.30-8 am., 10 am. to 4.30 pm. Daily 5-6.30 am., 12 n.-2.45 pm.	13.330	IRJ	ROME, ITALY, 22.69 m. Works Tokio 5-9 am. irregularly.	11.810	2RO	ROME, ITALY, 25.4 m., Addr. E.I.R.R., Via Montello 5. Daily 6.43-10.30 am., 11.30 am.-5.30 pm. Sun. 6.43-9 am., 11.30 am.-5.30 pm.
14.960	PSF	RIO DE JANEIRO, BRAZIL, 20.43 m., Works with Buenos Aires daytime.	12.825	CNR	RABAT, MOROCCO, 23.39 m., Addr. Director General Tele. & Teleg. Stations. Works with Paris irregularly.	11.803	JZJ	TOKIO, JAPAN, 25.42 m., Addr. Broadcasting Co. of Japan, Overseas Division. 12 m-1 am, 9-10 am, 2.30-3.30 pm., 4-5 pm.
14.950	HJB	BOGOTA, COL., 20.07 m. Calls WNC daytime.	12.800	IAC	PISA, ITALY, 23.45 m. Works Italian ships mornings.	11.800	OER2	VIENNA, AUSTRIA, 25.42 m. Daily 10 am.-5 pm. Sat. until 5.30 pm.
14.940	HII	CIUDAD TRUJILLO, D. R., 20.08 m., Phones WNC daytime.	12.780	GBC	RUGBY, ENG., 23.47. Works ships irregularly.	11.795	DJO	BERLIN, GERMANY, 25.43 m., Addr. (See 15.280 mc.). Irregular.
14.940	HJA3	BARRANQUILLA, COL., 20.08 m. Works WNC daytime.	12.485	HIN	CIUDAD TRUJILLO, D. R., 24 m. "Broadcasting National." 12 n.-2 pm. 6-11 pm. approx.	11.795	OAX5B	ICA, PERU, 25.43 m., Addr. Radio Universal. 11 am-12 n., 4-11.15 pm.
14.845	OCJ2	LIMA, PERU, 20.21 m. Works South American stations daytime.	12.325	DAF	NORDDEICH, GERMANY, 24.34 m. Works German ships daytime.	11.790	W1XAL	BOSTON, MASS., 25.45 m., Addr. (See 15.250 mc.) Daily 3.30-5.45 pm. Irregular at other times.
14.790	ROU	OMSK, SIBERIA, U.S.S.R., 20.28 m. Works Moscow irregularly 7-9 am.	12.300	CEB	SANTIAGO, CHILE, 24.39 m., Addr. Louis Desmarais, Casilla, 761. 11 am-1 pm., 4-8 pm., Sun. 4-10 pm.	11.770	DJD	BERLIN, GERMANY, 25.49 m., Addr. (See 15.280 mc.) 11.35 am-4.30 pm., 4.50-11 pm.
14.730	IQA	ROME, ITALY, 20.37 m. Tests irregularly.	12.250	TYB	PARIS, FRANCE, 24.49 m. Irregular.	11.760	OLR4B	PRAGUE, CZECHOSLOVAKIA, 25.51 m., Addr. (See 11.875 mc.) Irregular.
14.653	GBL	RUGBY, ENG., 20.47 m. Works JVH 1-7 am.	12.235	TFJ	REYKJAVIK, ICELAND, 24.52 m. Works Europe mornings. Broadcasts Sun. 1.40-2.30 pm.	11.750	GSD	DAVENTRY, ENG., 25.53 m., Addr. B. B. C., London. 12 M-2.15 am., 12.20-3.45 pm., 6.20-8.30, 9-11 pm.
14.640	TYF	PARIS, FRANCE, 20.49 m. Works Saigon and Cairo 3-7 am, 12 m-2.30 pm.	12.215	TYA	PARIS, FRANCE, 24.56 m. Works French ships in morning and afternoon.	11.730	—	SAIGON, INDO CHINA, 25.57 m., Addr. Radio Phileo. Irregular 5.30-9.30 am.
14.600	JVH	NAZAKI, JAPAN, 20.55 m. Broadcasts irregularly 5-11.30 pm. Works Europe 4-8 am.	12.150	GBS	RUGBY, ENG., 24.69 m. Works N. Y. C. evenings.	11.730	PHI	HUIZEN, HOLLAND, 25.57 m., Addr. N. Y. Philips' Radio. Irregular.
14.590	WMN	LAWRENCEVILLE, N. J., 20.56 m., Addr. A. T. & T. Co. Works England morning and afternoon.	12.130	DZE	ZEESEN, GERMANY, 24.73 m., Addr. (See 15.360 mc.) Tests irregular.			(Continued on page 133)
14.535	HBJ	GENEVA, SWITZERLAND, 20.64 m., Addr. Radio Nations. Broadcasts Sat. 5.30-6.15 pm., 7-8.30 pm.	12.120	—	ALGIERS, ALGERIA, 24.75 m. Calls Paris 12 m-6.30 pm.			
14.530	LSN	BUENOS AIRES, ARG., 20.65 m., Addr. (See 20.020 mc.) Works N. Y. C. afternoons.						
14.500	—	ASMARA, ERITREA, AFRICA, 20.69 m. Works Rome and Addis Ababa 6.30-7.30 am.						

(All Schedules Eastern Standard Time)

Mc.	Call	
11.720	CJRX	WINNIPEG, CANADA, 25.6 m., Addr. James Richardson & Sons, Ltd. 4-10pm.
11.718	CR7RH	LAURENCO MARQUES, PORTUGUESE, E. AFRICA, 25.6 m. Daily 4.30-6.30, 9.30-11 am., 12.30-3.30 p.m. Sun. 6-8 am., 10 am.-12.30 pm., 1.30-3.20 pm.
11.715	TPA4	PARIS, FRANCE, 25.61 m., (See 15.245 mc.) 5.15-7 pm., 9 pm.-12 m.
11.710	SBG	MOTALA, SWEDEN, 25.63 m., 9 am.-1.30 pm.

↑ S.W. BROADCAST BAND ↑

Mc.	Call	
11.680	KIO	KAHUKU, HAWAII, 25.68 m., Addr. RCA Communications. Irregularly.
11.600	COCX	HAVANA, CUBA, 25.86 m. 8 am.-1 am. Relays CMX.
11.595	VRR4	STONY HILL, JAMAICA, B. W. I., 25.87 m. Works WNC daytime.
11.560	VIZ3	FISKVILLE, AUSTRALIA, 25.95 m., Addr. Amalgamated Wireless of Australasia Ltd. Tests irregularly.
11.500	XAM	MERIDA, YUCATAN, 26.09 m. Irregular 1-7.30 pm.
11.500	PMK	BANDOENG, JAVA, 26.09 m. Tests irregularly.
11.413	CJA4	DRUMMONDVILLE, QUE., CAN., 26.28 m. Tests irregularly.
11.405	HBO	GENEVA, SWITZERLAND, 26.30 m., Addr. Radio Nations. Sat. 5.30-6.15, 7.8-30 pm.
11.280	HIN	CIUDAD TRUJILLO, D. R., 26 m., Addr. La Voz del Partido Dominicano. Irregular.
11.050	ZLT4	WELLINGTON, NEW ZEALAND, 27.15 m. Works Australia and England early morning.
11.040	CSW	LISBON, PORTUGAL, 27.17 m., Addr. Nat. Broadcasting Sta. 1.30-6 pm.
11.000	PLP	BANDOENG, JAVA, 27.27 m. Relays YDB. 5.30-10.30 or 11 am. Sat. until 11.30 am.
10.970	OCI	LIMA, PERU, 27.35 m. Works Bogota, Col. evenings.
10.840	KWV	DIXON, CALIF., 27.68 m., Addr. A. T. & T. Co. Works with Hawaii evenings.
10.770	GBP	RUGBY, ENGLAND, 27.85 m. Works Australia early morning.
10.740	JVM	NAZAKI, JAPAN, 27.93 m. Works U.S.A. 2-7 am. Broadcasts daily 9-10 am., 2.30-3.30 pm.
10.675	WNB	LAWRENCEVILLE, N. J., 28.1 m., Addr. A. T. & T. Co. Works with Bermuda irregularly.
10.670	CEC	SANTIAGO, CHILE, 28.12 m. Daily 7-7.15 pm.
10.660	JVN	NAZAKI, JAPAN, 28.14 m. Broadcasts daily 2-8 am. Works Europe irregularly at other times.
10.550	WOK	LAWRENCEVILLE, N. J., 28.44 m., Addr. A. T. & T. Co. Works S. A. nights.
10.535	JIB	TAIWAN, FORMOSA, 28.48 m. Works Japan around 6.25 am.
10.520	VLK	SYDNEY, AUSTRALIA, 28.51 m., Addr. Amalgamated Wireless of Australasia Ltd. Works England 1-6 am.
10.430	YBG	MEDAN, SUMATRA, 28.76 m. 5.30-6.30 am., 7.30-8.30 pm.
10.420	XGW	SHANGHAI, CHINA, 28.79 m. Works Japan 12 m.-3 am.
10.410	PDK	KOOTWIJK, HOLLAND, 28.8 m. Works Java 7.30-9.40 am.
10.410	KES	BOLINAS, CALIF., 28.8 m., Addr. RCA Communications. Irregular.
10.370	JVO	NAZAKI, JAPAN, 28.93 m. Broadcasts around 5 am.
10.370	EHZ	TENERIFFE, CANARY ISLANDS, 28.93 m. Relays EAJ43 2-4, 6-8.30 pm.
10.350	LSX	BUENOS AIRES, ARG., 28.98 m., Addr. Transradio International. Broadcasts 5-6 pm. Mon. and Fri. Tests irregularly at other times.
10.330	ORK	RUYSSELEDE, BELGIUM, 29.04 m. 1.30-8 pm.
10.300	LSL2	BUENOS AIRES, ARG., 29.13 m., Addr. Cia. Internacional de Radio. Works Europe evenings.

SHORT WAVES and LONG RAVES

Our Readers Forum

J. L. Bodcote Has 847 QSL's



Here's Judge L. Bodcote, a "cracker-jack" S-W listener. If they're "gettable," Judge "bags" em!

Editor, SHORT WAVE & TELEVISION:

The receiver I employ is an RCA-ACR 136 7-tube Communications type. My antennas are a 60-foot, 40-meter doublet, 70 feet high, running E.-W. with 53-foot twisted feeders, and a 200-foot inverted "L", 74 feet high running N.-S. My DX is 47 VK's on 20 meter phone ON, SW, F8, LU, K6, K5, EA, G, ZL, etc. I have a total of 847 QSL's from "all over the world." I've been a reader of *Short Wave Craft* for two years, and couldn't get along without it.

My DX is: VK30C, VK2AZ, VK5AI, VK5LR, G6XR, G5NI, ON4VK, and many others.

Member of *Short Wave League* and *International Broadcasting Club* (London).
Judge L. Bodcote
29 Melrose Ave.
East Norwalk, Conn.

Has Received 21 Countries

Editor, SHORT WAVE & TELEVISION:

I have been a constant reader of your fine magazine ever since I first became interested in Short Wave DX'ing, several years ago. Next to "Listening In" with Joe Miller, I enjoy reading your "Short Waves and Long Raves" best.

My receiver is an 18 tube Midwest, coupled to a McMurdo R9 antenna. I find that this combination works very well together and have gotten excellent results from it.

Trophy Winner—Walter E. Butts

The picture herewith shows trophy winner Walter E. Butts of Worthington, Ohio. He was the thirty-sixth trophy winner in our Short Wave Scout DX "Log" Contest. Mr. Butts says in his letter—"My friends all think that the trophy is the finest that they have ever seen. I certainly agree with them too. I am very proud of it and wish to thank you sincerely for the trophy. I will be glad to answer all SWL cards and prefer to receive them written in English, where foreign listeners are concerned. A 16-tube Midwest is used."

Walter E. Butts,
620 Hartford St.,
Worthington, Ohio.

My antenna is 58 feet high and situated NE-SW. With my aerial in this position I find that signals can be received as well from one direction as another.

I have been DX'ing on the *Short Waves* for about three years, but did not get very good results until I purchased my new receiver last November. Since then I have received 21 countries, and verified 12 of them. Since the first of Nov. I have heard the following DX: All VE districts, CO2-7-8, K4-6-7, XE1-2-3, LU5-7-9, OA4, VO1, VK2-3, CE1-3, YV1, G2-5-6, VP2-3-9, F3, SU1, J2, VQ1, and HI5-7. I will look forward to seeing future issues of your swell magazine.

Delbert Holden,
523 O Street,
Fresno, California



A swell "SWL" card is sent out by Delbert Holden.

Likes the "2 Vt. Super DX-4"

Editor, SHORT WAVE & TELEVISION:

Many thanks for your latest battery set, the "2-Volt Super DX-4." It is just what I have been waiting for. As I write I am listening to ZTJ (Johannesburg) S. A. The volume is overpowering on the Europeans and even now it is at "entertaining strength," and I use no ground! It can beat all the sets round about.

Your magazine beats all the English journals for the amount of educational matter, and I would not miss getting it for worlds.

My hands are itching to turn those knobs! So wishing you success with your publication, I am,

Yours faithfully,
R. Hodgson, Lower Heysham,
8 Main St., Lancashire, England

An Enthusiastic "XYL" Operator



Hilda Scott Harwood, a southern "XYL," hailing from Richmond, Va.

Editor, SHORT WAVE & TELEVISION:

The main receiver is a revamped Hallicrafter and works very well on 20, 40 and 80 meters. The 5 meter receiver on the left of the Hallicrafter is a National. Above is the old three-circuit Zenith regenerative receiver and it is fine for code practice up to 1,200 meters. The two "Mac" keys are used with a buzzer for code practice. The phones are Baldwin type "C" but are used very little, as the Hallicrafter brings them in loud enough for speaker use most of the time. The five meter "rig" is used for local reception and the phones are used with it.

I will send to any amateur or SWL (Short Wave Listener) a souvenir for their station, if they will send a three-cent stamp to cover mailing. The demand for these souvenirs has been so great that I have to ask for the stamp, so I'll have money enough to buy new equipment. Hi! I will trade photos with anyone and all mail will be answered.

I like *Short Wave & Television* very much and wish it every success.

Hilda Scott Harwood
3104 Edgewood Avenue
Richmond, Va.

Has 12 S. W. & T. Sets Working O.K.!

Editor, SHORT WAVE & TELEVISION:

I have been taking your magazine since it first came on the newsstands, and haven't missed one. I have a dozen of your sets working O.K., now, and I have six in one cabinet, with a single switch to turn on or off any one I want to use. By this you can see that short waves keep me busy.

Well, every "Fan" has his pet set and I have mine. It is the 2-tube Doerle" for 31 meters and the Periphone Master 2-tube. I have been using a 10 meter set for the past month as a one-tube set. This will be news to you, and no kidding, all the W6 stations (Ham) come in like a ton of brick, but one day recently I couldn't get a station on 10-meters. I heard a station in Dublin, Ireland, EI2J talking to W6, and a British (India) station talking to a VE3ACU.

"A Constant Reader,"
J. C. Haley,
807 N.R. 23rd Street,
St. Joseph, Mo.

(Hotcha! J.C.H.! Hope you like the "brand" of our sets we've been showing you lately.—Editor.)

(Continued on page 154)

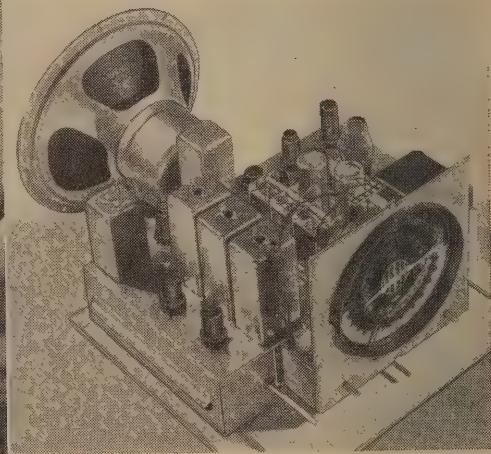
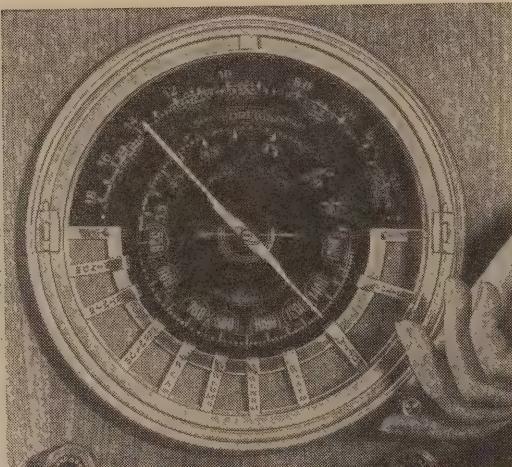
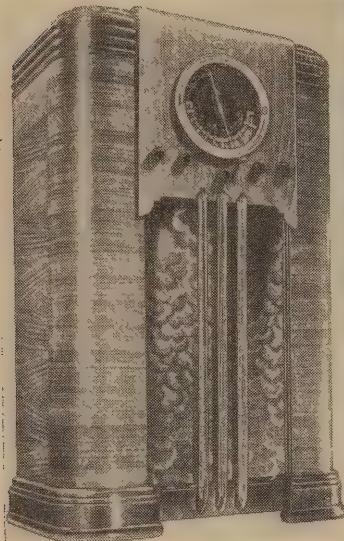
Mo.	Call	VERA CRUZ, MEXICO, 31.61 m. 11.30 am. to 4 pm., 7 pm. to 12 m.	Mo.	Call	HURLINGHAM, ARGENTINA, 37.97 m. Works Brazil at night.	Mo.	Call	CIUDAD TRUJILLO, D. R., 45.74 m. Except Sun. 11.55 am.-1.40 pm.
9.470	XEDQ	GUADALAJARO, GAL, MEXICO, 31.68 m. Irregular 7.30 pm. to 12.30 am.	7.801	LSL	ABOU ZABAL, EGYPT, 38.17 m. Works with Europe, 4-6 pm.	6.558	H14D	VERA CRUZ, MEX., 45.8 m. 8.15-9 am.
9.480	ICK	TRIPOLI, N. AFRICA, 31.71 m. Works Rome, 5.30-7 am.	7.854	HC2JSB	GUAYAQUIL, ECUADOR, 38.2 m. Evenings.	6.559	XBC	SAN JOSE, COSTARICA, 45.8 m., Addr. Radioemisora Catolica Costarricense.
9.490	TGWA	GUATEMALA CITY, GUATEMALA, 31.75 m. Addr. Ministre de Fomento. Daily 12 n. to 2 pm., 8 pm. to 12 m. Sat. 9 pm. to 5 am. (Sun.)	7.799	HBP	GENEVA, SWITZERLAND, 38.47 m., Addr. Radio-Nations. Irregular.	6.560	TIRCC	Daily 12 n.-2 pm., 6-7, 8-9 pm. Thurs. 6-11 pm.
9.440	FZFS	FORT de FRANCE, MARTINIQUE, 31.78 m. 11.30 am., 12.30 pm., 6.15-7.15 pm., 8-9 pm.	7.715	KEE	BOLINAS, CAL., 38.89 m. Relays NBC and CBS programs in evening irregularly.	6.545	YVERB	BOLIVAR, VENEZUELA, 45.84 m., Addr. "Ecos de Orinoco." 6-10.30 pm.
9.440	HC2RA	GUAYAQUIL, ECUADOR, 31.78 m. Irregularly till 10.40 pm.	7.626	RIM	TACHKENT, U.S.S.R., 39.34 m. Works with Moscow in early morning.	6.550	YN10G	MANAGUA, NICARAGUA, 45.94 m., Addr. "La Voz de los Lagos." 8-9 pm.
9.428	COCH	HAVANA, CUBA, 31.8 m., Addr. 2 B St., Vedado. 7 am.-1 am.	7.610	KWX	DIXON, CAL., 39.42 m. Works with Hawaii, Philippines, Java and Japan, nights.	6.520	YV4RB	VALENCIA, VENEZUELA, 46.01 m. 11 am.-2 pm., 5-10 pm.
9.415	PLV	BANDOENG, JAVA, 31.87 m. Works Holland around 9.45 am.	7.550	T18WS	PUNTA ARENAS, COSTA RICA, 39.74 m., Addr. "Ecos Del Pacifico", P. O. Box 75. 6 pm.-12 m.	6.500	HIL	CIUDAD TRUJILLO, D. R., 46.15 m., Addr. Apartado 623. 12.10-1.40 pm., 5.40-7.40 pm.
9.350	HS8PJ	BANGKOK, SIAM, 32.09 m. Thursday, 8-10 am.	7.520	KKH	KAHAKU, HAWAII, 39.89 m. Works with Dixon and broadcasts irregularly nights.	6.500	T10W	PUERTO LIMON, COSTA RICA, 46.15 m., Addr. Ondas del Caribe. Daily 12 n.-1.30 pm.
9.330	CGA4	DRUMMONDVILLE, CANADA, 32.15 m. Works England irregularly.	7.510	JVP	NAZAKI, JAPAN, 39.95 m. Irregular.	6.477	HI4V	SAN FRANCISCO de MACORIS, D. R., 46.32 m. 11.40 am.-1.40 pm., 5.10-9.40 pm.
9.330	OAX4J	LIMA, PERU, 32.15 m., Addr. Box 1166, "Radio Universal." 7 pm.-12 m.	7.500	RKI	MOSCOW, U.S.S.R., 40 m. Works with RIM early am.	6.470	YNLAT	GRANADA, NICARAGUA, 46.36 m., Addr. Leonidas Tenorio, "La Voz del Mombacho." Irregular.
9.300	YNGU	MANAGUA, NICARAGUA, 32.26 m. 12 n.-2 pm., 6-7 pm.	7.390	ZLT2	WELLINGTON, N. Z., 40.6 m. Works with Sydney, 3-7 am.	6.450	H18A	CIUDAD TRUJILLO, D. R., 46.51 m. 8.40-10.40 am., 2.40-4.10 pm. Sat. 9.40-10.40 pm. Sun. 2.40-4.40 pm.
9.280	GCB	RUGBY, ENGLAND, 32.33 m. Works Canada and Egypt evenings and afternoons.	7.380	XECR	MEXICO CITY, MEX., 40.65 m., Addr. Foreign Office. Sunday 6-7 pm.	6.420	HI1S	SANTIAGO, D. R., 46.73 m. 11.40 am.-1.40 pm., 5.40-7.40, 9.40-11.40 pm.
9.170	WNA	LAWRENCEVILLE, N. J., 32.72 m. Works England evenings.	7.220	HKE	BOGOTA, COL., S. A., 41.55 m. Tues. and Sat. 8-9 pm. Mon. and Thurs. 6.30-7 pm.	6.410	TIPG	SAN JOSE, COSTA RICA, 46.8 m., Addr. Apartado 225, "La Voz de la Victor." 12 n.-2 pm., 6-11.30 pm.
9.150	YVR	MARACAY, VENEZUELA, 32.79 m. Works with Europe afternoons.	7.200	YNAM	MANAGUA, NICARAGUA, 41.67 m. Daily at 9 pm.	6.400	YV5RH	CARACAS, VENEZUELA, 46.88 m. 7-11 pm.
9.125	HAT4	BUDAPEST, HUNGARY, 32.88 m., Addr. "Radiolabor," Gyal-ut, 22. Sun. and Wed. 7-8 pm., Sat. 6-7 pm.	7.100	FO8AA	PAPEETE, TAHI, 42.25 m., Addr. Radi Club Papeete. Tues. and Fri. 11 pm.-12 m.	6.380	YV5RF	CARACAS, VENEZUELA, 47.02 m., Addr. Box 983. 6-10.30 pm.
9.060	TFK	REYKJAVIK, ICELAND, 33.11 m. Works London afternoons.	6.398	PZH	PARAMIRABO, DUTCH GUIANA, 42.88 m., Addr. P. O. Box 18. Daily 6.06-8.36 am., Sun. 9.36-11.36 am., Daily 5.36-8.36 pm.	6.360	HRP1	SAN PEDRO SULA, HONDURAS, 47.19 m. 7.30-9.30 pm.
9.020	GCS	RUGBY, ENGLAND, 33.26 m. Works N. Y. C. evenings.	6.977	XBA	TACUBAYA, D. F., MEX., 43 m. 9.30 am.-1 pm., 7-8.30 pm.	6.350	YV1RH	MARACAIBO, VENEZUELA, 47.19 m., Addr. "Ondas Del Lago," Apartado de Correos 261. 6-7.30 am., 11 am.-2 pm., 5-11 pm.
9.010	KEJ	BOLINAS, CAL., 33.3 m. Relays NBC and CBS programs in evening irregularly.	6.976	HCETC	QUITO, ECUADOR, 43 m., Addr. Teatro Bolivar. Thurs. till 9.30 pm.	6.350	HRY	TEGUCIGALPA, HONDURAS, 47.24 m. 6.30-8.30 pm.
8.957	VWY	KIRKEE, INDIA, 33.43 m. Works with England in morning.	6.905	GDS	RUGBY, ENG., 43.45 m. Works N.Y.C. evenings irregularly.	6.340	HI1X	CIUDAD TRUJILLO, D. R., 49.32 m. Sun. 7.40-10.40 am., daily 12.10-1.10 pm., Tues. and Fri. 8.10-10.10 pm.
8.960	—	ALGIERS, ALGERIA, 33.48 m. Works Paris afternoons.	6.560	KEL	BOLINAS, CALIF., 43.70 m. Tests irregularly. 11 am.-12 n., 6-9 pm.	6.316	HIZ	CIUDAD TRUJILLO, D. R., 47.5 m. Daily except Sat. and Sun. 11.10 am.-2.25 pm., 5.10-8.40 pm. Sat. 5.10-11.10 pm. Sun. 11.40 am.-1.40 pm.
8.950	HCJB	QUITO, ECUADOR, 33.5 m. 7-10 pm. except Monday.	6.850	XGOX	NANKING, CHINA, 43.8 m. Daily 6.40-8.40 am., Sun. 4.40-6.05 am.	6.310	TG2	GUATEMALA CITY, GUAT., 47.55 m., Addr. Secretaria de Fomento. Relays TG1 11 pm.-1 am.
8.795	HKV	BOGOTA, COLOMBIA, 34.09 m. Mon. and Thurs. 7-7.30 pm.	6.800	HT1P	CIUDAD TRUJILLO, DOM. REP., 44.12 m., Addr. Emisoria Diaria de Comercio. Daily exc. Sat. and Sun. 12.40-1.40, 6.40-8.40 pm. Sat. 12.40-1.40 pm. Sun. 10.40 am.-11.40 am.	6.300	YV4RG	MARACAY, VENEZUELA, 47.62 m. 8-10.30 pm.
8.775	PNI	MAKASSER, CELEBES, N. I., 34.19 m. Works Java around 4 am.	6.770	HTH	SAN PEDRO DE MACORIS, DOM. REP., 44.26 m. 12.10-1.40 pm., 7.30-9 pm. Sun. 3-4 am., 4.15-6 pm., 4.40-7.40 pm.	6.282	COHB	SANCTI SPIRITUS, CUBA, 47.76 m., Addr. P. O. Box 85. 4-6, 9-11 pm.
8.765	DAF	NORDDEICH, GERMANY, 34.23 m. Works German ships irregularly.	6.775	WOA	LAWRENCEVILLE, N. J., 44.41 m., Addr. A. T. & T. Co. Works England evenings.	6.280	H1G	CIUDAD TRUJILLO, D. R., 47.77 m. 7.10-8.40 am., 12.40-2.10, 8.10-9.40 pm.
8.760	GCQ	RUGBY, ENGLAND, 34.25 m. Works Africa afternoons.	6.750	JVT	NAZAKI, JAPAN, 44.44 m., Addr. Kokusai-Denwa Kaisha, Ltd., Tokio. Irregular.	6.270	YV5RP	CARACAS, VENEZUELA, 47.79 m., Addr. "La Voz de la Philco." Irregular.
8.750	FZE8	DJIBOUTI, FR. SOMALILAND, AFRICA, 34.29 m. Works Paris around 2.30 am.	6.730	HI3C	LA ROMANA, DOM. REP., 44.58 m., Addr. "La Voz de la Feria." 12.30-2 pm., 5-6 pm.	6.243	HIN	CIUDAD TRUJILLO, D. R., 48 m., Addr. "La Voz del Partido Dominicano." 12 m.-2 pm., 7.30-9.30 pm., irregularly.
8.730	GCI	RUGBY, ENGLAND, 34.36 m. Works India 8 am.	6.720	PMH	BANDOENG, JAVA, 44.64 m. Relays NIROM programs. 5.30-9 am.	6.235	HRD	LA CEIBA, HONDURAS, 48.12 m., Addr. "La Voz de Atlantida." 8-11 pm.; Sat. 8 pm.-1 am.; Sun. 4-6 pm.
8.720	VPD3	SUVA, FIJI ISLES, 34 m., Addr. (See 9.540 mc., VP2D). 5.30-7 am.	6.710	TIEP	SAN JOSE, COSTA RICA, 44.71 m., Addr. Apartado 257, La Voz del Tropico. Daily 7-10 pm.	6.230	YV1RG	VALERA, VENEZUELA, 48.15 m. 6-9.30 pm.
8.680	GBC	RUGBY, ENGLAND, 34.56 m. Works ships irregularly.	6.672	YVQ	MARACAY, VENEZUELA, 44.95 m. Sat. 8-9 pm.	6.210	YV5RI	LIMA, PERU, 48.15 m., Addr. Apartado 1242. Daily 7-10.30 pm.
8.665	CO9JQ	CAMAGUEY, CUBA, 34.62 m., Addr. 4 General Gomez. 5.30-6.30, 8-9 pm., daily except Sat. and Sun.	6.670	HC2RL	GUAYAQUIL, ECUADOR, S. A., 44.95 m., Addr. P. O. Box 759. Sun. 5.45-7.45 pm., Tues. 9.15-11.15 pm.	6.190	H18Q	CORO, VENEZUELA, 48.31 m., Addr. Roger Leyba, care A. Urbina y Cia. Irregular.
8.580	YNLG	MANAGUA, NICARAGUA, 34.92 m. 7.30-9.30 pm.	6.650	IAC	PISA, ITALY, 45.11 m. Works ships irregularly.	6.185	HI1A	CIUDAD TRUJILLO, D. R., 48.47 m. 11.45 am.-1 pm., 4.45-6.45 pm.
8.560	WOO	OCEAN GATE, N. J., 35.05 m. Works ships irregularly.	6.630	HIT	CIUDAD TRUJILLO, D. R., 45.25 m., Addr. "La Voz de la RCA Victor," Apartado 1105. Daily exc. Sun. 12.10-1.40 pm., 5.40-8.40 pm.; also Sat. 10.40 pm.-12.40 am.	6.171	XEXA	SANTIAGO, D. R., 48.5 m., Addr. Box 423. 11.40 am.-1.40 pm.; 7.40-9.40 pm.; Wed. 6-10.30 pm.
8.400	HC2CW	GUAYAQUIL, ECUADOR, 35.71 m. 11.30 am.-12.30 pm., 8-11 pm.	6.625	PRADO	RIOBAMBA, ECUADOR, 45.28 m. Thurs. 9-11.45 pm.	6.160	YVERD	MEXICO CITY, MEX., 48.61 m., Addr. Dept. of Education. 7-11 pm.
8.380	IAC	PISA, ITALY, 35.8 m. Works Italian ships irregularly.						↓ S.W. BROADCAST BAND ↓
8.190	XEME	MERIDA, YUCATAN, 36.63 m., Addr. Calle 59, No. 517, "La Voz de Yucatan desde Merida." 10 am.-12 n., 6 pm.-12 m.						(Continued on page 187)
8.185	PSK	RIO DE JANEIRO, BRAZIL, 36.65 m. Irregularly.						
8.036	CNR	RABAT, MOROCCO, 37.33 m. Sun. 2.30-5 pm.						
7.975	HC2TC	QUITO, ECUADOR, 37.62 m. Thurs. and Sun. at 8 pm.						

WHAT'S NEW

In Short-Wave Apparatus

The short-wave apparatus here shown has been carefully selected for description by the editors after a rigid investigation of its merits.

KNIGHT 11 Tuber Has Automatic Dialing



Left—Console model of the Knight 11-tube receiver, with automatic dialing feature. Center—"Close-up" of the large dial, showing how names of favorite stations are "pre-set" to permit automatic dialing of these stations. Right—The 11-tube chassis and speaker. (No. 624)

OF interest to all short wave "Fans" and broadcast listeners who desire a real thrill as well as a great convenience in tuning, here is the new 11-tube Knight receiver. At the flip of a finger you can tune in instantly any one of 12 "favorite" stations, which are pre-set around the bottom half of the dial as the pictures show. This receiver has all of the latest features—including automatic frequency tuning, which tunes the set automatically and exactly to the station, in case you should tune in carelessly.

This 11-tube set covers three full bands—16 to 54 and 52 to 178 meters, for short-wave domestic and overseas programs, as

well as amateur and police signals; and it also covers the band from 174 to 560 meters, which includes the American and Canadian standard broadcast stations.

Other interesting features are the giant color-band dial; metal tubes; 9 watts power output; a 12-inch electro-dynamic speaker; automatic frequency control; automatic tone control; automatic volume control; inter-station noise silencer; three-gang tuning condenser; R.F. pre-selection; and double push-pull audio. The console cabinet measures 41" high, 26½" wide and 14½" deep. Ten new tubes and one glass type are used effectively as follows: 6K7 as Pre-tuned R.F.; 6A8 as Mod.-Osc.; 6K7 as

I.F.; 6J7 as A.F.C.; 6H6 as Det.-A.V.C.; 6C5 as 1st Audio; 2-6C5 as push-pull 2nd Audio; 2-6F6 as push-pull power stage; 80 as rectifier. You receive the most from each of these tubes, reflected in full nine watts undistorted output and high fidelity tone.

Automatic tone control boosts bass automatically, without cutting out the high notes. This receiver has five positions permitting perfect acoustical matching for any type of program. It also has final position for best possible noise-free distance and short-wave reception.

This article has been prepared from data supplied by the courtesy of the Allied Radio Corp.

New Devices for S-W Amateurs

New Dynamic Microphone

THE new dynamic microphone shown in the photo is a product of the American Microphone Company. It is available in two types, the standard type D-5, and the high impedance unit type D-5-T. These units come complete with a plug at the microphone end. This with a 25-ft. shielded rubber-covered cable microphone is 2½-inches in diameter and 3½-inches in length, and weighs 1½ lbs. It is finished in black satin with chrome trim. The sensitivity level of the mike is approximately minus 55-DB. High permeability nickel-alloy transformer is enclosed in the microphone case. This combination will work with cables up to a length of 50 ft. without frequency discrimination. The impedance of one unit is 10,000 ohms, while that of the low impedance

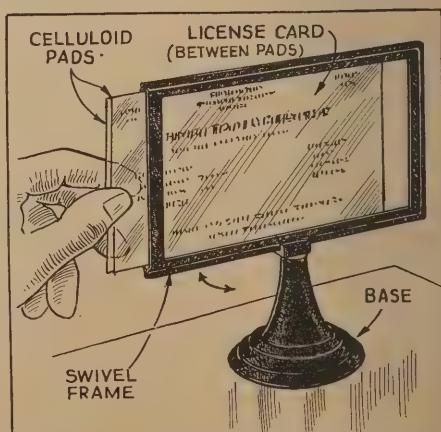
unit is approximately 50 ohms. This is suitable for public address, amateur work, and many other similar uses (No. 625).

This article has been prepared from data supplied by courtesy of American Microphone Co.

Mounting for Ham License

AT last the amateur is provided with a very convenient and neat-appearing mounting unit for his license. The illustration shows the general design, whose main features are the swivel holder with the transparent celluloid windows on either side. The unit shown in the illustration is for desk mounting. Another type is available with an offset arm, permitting it to be mounted on the side-wall.

Our information bureau will gladly supply manufacturers' names and addresses of any item mentioned in SHORT WAVE & TELEVISION. Please enclose a stamped return envelope.



Clever 2-faced License Holder Shows Both Sides (No. 626)

Mc	Call	Mc	Call	Mc	Call
6.150	VUZ	COLOMBO, CEYLON, 48.7 m. Daily exc. Thurs. and Fri. 7 1m.-12.30 pm.; Sun. 7-11.30 am.	6.090	ZBW2	HONGKONG, CHINA, 49.26 m., Addr. P. O. Box 200. Irregular.
6.150	CSL	LISBON, PORTUGAL, 48.78 m. Irregular. 7-8.30 am., 2-7 pm.	6.085	HJ5ABD	CALI, COLOMBIA, 49.3 m., Addr. La Voz de Valle. 12m.-1.30 pm., 5.10-9.40 pm.
6.150	CJRO	WINNIPEG, MAN., CANADA, 48.78 m., Addr. (See 11.720 mc.) 4-10 pm.	6.083	VQ7LO	NAIROBI, KENYA, AFRICA, 49.31 m., Addr. Cable and Wireless, Ltd. Mon.-Fri. 5.45-6.15 am., 11.30 am.-2.30 pm., also Tues. and Thurs. 8.30-9.30 am.; Sat. 11.30 am.-3.30 pm.; Sun. 11 am.-2 pm.
6.147	ZEB	BULAWAYO, RHODESIA, S. AFRICA, 48.8 m. Sun. 3.30-5 am.; Tues., Fri., 1.15-3.15 pm.; Mon. and Thurs. 11 am.-12 m.	6.080	ZHJ	PENANG, FED. MALAY STATES, 49.34 m. 6.40-8.40 am., except Sun., also Sat. 11 pm.-1 am.
6.147	COKG	SANTIAGO, CUBA, 48.8 m., Addr. Box 137. 9-10 am., 11.30 am.-1.30 pm., 3-4.30 pm., 10-11 pm., 12 m.-2 am.	6.080	CP5	LAPAZ, BOLIVIA, 49.34 m. 7-10.30 pm.
6.145	HJ4ABU	PEREIRA, COL., 48.8 m. 9.30 am.-12 m., 6.30-10 pm.	6.080	HP5F	COLON, PAN., 49.31 m., Addr. Carlton Hotel. 11.45am.-1.15 pm., 7.45-10 pm.
6.140	WBXK	PITTSBURGH, PA., 48.86 m., Addr. Westinghouse Electric & Mfg. Co. Relays KDKA 9 pm.-12 m.	6.080	W9XAA	CHICAGO, ILL., 49.34 m., Addr. Chicago Fed. of Labor. Relays WCFL irregular.
6.137	CR7AA	LAURENCO MARQUES, PORT. E. 48.87 m. 4-9, 10.30-11 am., 12 m.-3.30 pm., 11.15 pm.-1 am.	6.079	DJM	BERLIN, GERMANY, 49.34 m., Addr. Broadcasting House. Irregular.
6.135	HJ1ABB	BARRANQUILLA, COL., 48.9 m., Addr. P. O. Box 715. 11.30 am.-1 pm., 4.30-10 pm.	6.070	HJ3ABF	BOGOTA, COL., 49.42 m. 7-11.15 pm.
6.135	HISN	SANTIAGO, D. R., 48.9 m. 6.40-9.10 pm	6.070	CFRX	TORONTO, CAN., 49.42 m. Relays CFRB irregularly 7 am.-12 m.
6.130	TGX A	GUATEMALA CITY, GUAT., 48.94 m., Addr. Giornal Liberal Progressista. Irregularly.	6.070	YV1RE	MARACAIBO, VEN., 49.42 m. 6-11 pm.
6.130	COCO	HAVANA, CUBA, 48.94 m., Addr. Calle G y 25. Vedado. Relays CMCD 11 am.-12 m., 7-10 pm.; Sun. 12m.-4 pm.	6.070	VE9CS	VANCOUVER, B. C., CAN., 49.42 m. Sun. 1.45-9 pm., 10.30 pm.-1 am.; Tues. 6-7.30 pm., 11.30 pm.-1.30 am. Daily 6-7.30 pm.
6.130	VE9HX	HALIFAX, N. S., CAN., 48.94 m., Addr. P. O. Box 998. Mon.-Fri. 9 am.-1 pm., 5-11 pm.; Fri.; 1-3 pm., Sat.; Sun. 9 am.-1 pm., 2-11 pm. Relays CHNS.	6.065	HJ4ABL	MANIZALES, COL., 49.46 m. Daily 11 am.-12 m., 5.30-7.30 pm.; Sat. 5.30-10.30 pm.
6.130	ZGE	KUALA LUMPUR, FED. MALAY ST., 48.94 m. Sun., Tue. and Fri. 6.40-8.40 am.	6.065	SBG	MOTALA, SWEDEN, 49.46 m. Relays Stockholm 1.30-6 pm.
6.130	LKL	JELOY, NORWAY, 48.94 m. 11 am.-6 pm.	6.060	W8XAL	CINCINNATI, OHIO, 49.46 m., Addr. Crosley Radio Corp. Relays WLW 5.30 am.-7 pm., 10 pm.-1 am.
6.125	—	MONTEVIDEO, URUGUAY, 48.98 m., Addr. Radio Electrico de Montevideo., Mercedes 823. 3.30-9 pm.	6.060	W3XAU	PHILADELPHIA, PA., 49.5 m. Relays WCAU 7-10 pm.
6.125	HP5A	PANAMA CITY, PAN., 49 m. Addr. Box 58. 12 n-1 pm., 8-10 pm.	6.060	OXY	SKAMLEBOEAK, DENMARK, 49.5 m. 1-6.30 pm.
6.122	HJ3ABX	BOGOTA, COL., 49 m., Addr. La Voz de Col., Apartado 2663. 10.30 am.-2 pm., 5.30-11 pm.; Sun. 6-11 pm.	6.060	HJ3ABD	BOGOTA, COL., 49.59 m., Addr. Colombia Broadcasting, Box 509. 12m.-2 pm., 7-11 pm.; Sun. 5-9 pm.
6.120	W2XE	NEW YORK CITY, 49.02 m., Addr. Col. B'cast. System, 485 Madison Ave. 10-11 pm. Relays WABC.	6.040	W4XB	MIAMI BEACH, FLA., 49.65 m. Relays WIOD 12m.-2 pm., 5.30-6 pm., 10 pm.-12 m.
6.120	XEUZ	MEXICO CITY, MEX., 49.02 m., Addr. 5 de Mayo 21. Relays XEFO 1-3 am.	6.040	W1XAL	BOSTON, MASS., 49.65 m., Addr. University Club. Generally from 6-10 pm.
6.115	OLR2C	PRAGUE, CZECHOSLOVAKIA, 49.05 m. (See 11.875 mc.)	6.040	YDA	TANDJONGPRIOK, JAVA, 49.65 m., Addr. N.I.R.O.M., Batavia. 10.30 pm.-2 am.; Sat. 7.30 pm.-2 am.
6.110	XEPW	MEXICO CITY, MEX., 49.1 m., Addr. La Voz de Aguila Azteca desde Mex., Apartado 8403. Relays XEJW 11 pm.-1 am.	6.030	HJ4ABP	MEDELLIN, COL., 49.75 m. 8-11 pm.
6.110	VUC	CALCUTTA, INDIA, 49.1 m. Daily 3-5.30 am., 9.30 am.-12 m.; Sun 7.30 am.-12 m.	6.030	HP5B	PANAMA CITY, PAN., 49.75 m., Addr. P.O. Box 910. 12m.-1 pm., 7-10.30 pm.
6.105	HJ4ABB	MANIZALES, COL., 49.14 m., Addr. P. O. Box 175. Mon.-Fri. 12.15-1 pm.; Tue. and Fri. 7.30-10 pm.; Sun 2.30-5 pm.	6.030	VE9CA	CALGARY, ALTA., CAN., 49.75 m. Thur. 9 am.-2 am.; Sun 12 m.-12 m.
6.100	W3XAL	BOUND BROOK, N. J., 49.18 m., Addr. Natl. Broad. Co. 7-10 pm.	6.030	OLR2B	PRAGUE, CZECHOSLOVAKIA, 49.75 m. (See 11.875 mc.)
6.100	W9XF	CHICAGO, ILL., 49.18 m., Addr. N.B.C. 10.30 pm.-1 am.	6.025	HJ1ABJ	SANTA MARTA, COL., 49.79 m. 5.30-10.30 pm., except Wed.
6.100	HJ4ABE	MEDELLIN, COL., 49.18 m. 11 am.-12 m., 6-10.30 pm.	6.020	DJC	BERLIN, GERMANY, 49.83 m., Addr. (See 6.079 mc.) 11.35 am.-4.30 pm.
6.097	ZTJ	JOHANNESBURG, S. AFRICA, 49.2 m., Addr. African Broad. Co. Sun.-Fri. 11.45 pm.-12.30 am.; Mon.-Sat. 3.30-7 am., 9 am.-4 pm.; Sun. 8-10.15 am., 12.30-3 pm.	6.020	XEUW	VERA CRUZ, MEX., 49.83 m., Addr. Av. Independencia 98. 8 pm.-12.30 am.
6.095	ZJH	TOKIO, JAPAN, 49.22 m., Addr. (See 11.800 mc., ZJI). Irregular.	6.018	ZHI	SINGAPORE, MALAYA, 49.18 m., Addr. Radio Service Co., 20 Orchard Rd. Mon., Wed. and Thur. 5.40-8.0 am.; Sat. 10.40 pm.-1.10 am.
6.090	HJ4ABC	IBAQUE, COL., 49.26 m. 7 pm.-12 m.	6.015	HJ3U	SANTIAGO DE LOS CABALLEROS, D. R., 49.88 m. 7.30-9 am., 12m.-2 pm., 5-7 pm., 8-9.30 pm.; Sun. 12.30-2, 5-6 pm.
6.090	CRDX	TORONTO, CAN., 49.26 m., Addr. Can. Broadcasting Corp. Daily 5.30-11.30 pm.; Sun. 5-11.30 pm.	6.012	HJ3ABH	BOGOTA, COL., 49.91 m., Addr. Apartado 565. 6-11 pm.; Sun 12m.-2 pm., 4-11 pm.
6.090	—	—	6.010	VPSMR	GEORGETOWN, BRI. GUIANA, 49.9 m. Sun. 7.45-10.15 am.; Daily 4.45-8.45 pm.
6.090	—	—	6.010	COCO	HAVANA, CUBA, 49.92 m., Addr. P. O. Box 98. Daily 9.30 am.-1 pm., 4-7 pm., 8-10 pm.; Sat. also 11.30 pm.-2 am.
6.005	HP5K	COLON, PAN., 49.96 m., Addr. Box 33. 7.30-9 am., 12m.-1 pm., 6-9 pm.	6.005	CFCX	MONTREAL, CAN., 49.96 m., Can. Marconi Co. Relays CFCF 6 am.-11.15 pm.; Sun. 9 am.-11.15 pm.
6.005	VE9DN	DRUMMONDVILLE, QUE., CAN., 49.96 m., Addr. Canadian Marconi Co. Sat. 11.30 pm.-2 am.	6.000	ZEA	SALISBURY, RHODESIA, S. AFRICA, 50 m. (See 6.147 mc., ZEB.)
6.000	RV59	MOSCOW, U.S.S.R., 50 m. Irregular.	5.990	XEBT	MEXICO CITY, MEX., 50.08 m., Addr. P. O. Box 79-44. 8 am.-1 am.

↑ S.W. BROADCAST BAND ↑

5.970	HJ4ABD	MEDELLIN, COL., 50.26 m., Addr. La Voz Catia. 8-11.30 pm.
5.958	HVJ	VATICAN CITY, 50.27 m. 2-2.15 pm. daily; Sun. 5-5.30 am.
5.950	HJN	BOGOTA, COL., 50.42 m. 6-11 pm.
5.940	TG2X	GUATEMALA CITY, GUAT., 50.5 m. 4-6, 9-11 pm.; Sun. 2-5 am.
5.930	YV1RL	MARACAIBO, VEN., 50.59 m., Addr. Radio Popular, Jose A. Higuera M., P. O. Box 247. Daily 11.43 am.-1.43 pm., 5.13-10.13 pm.; Sun. 9.13 am.-3.13 pm.
5.925	HH2S	PORT-AU-PRINCE, HAYTI, 50.63 m., Addr. P. O. Box A103. 7-9.45 pm.
5.917	YV4RP	VALENCIA, VEN., 50.71 m. Irregular.
5.900	TIMS	PUNTARENAS, COSTA RICA, 50.85 m. 6-10 pm.
5.898	YV3RA	BARQUISIMETO, VEN., 50.86 m., Addr. La Voz de Lara, 12 m.-1 pm., 6-10 pm.
5.890	JIC	TAIHOKU, FORMOSA, 50.93 m. Works Tokio 6-9 am.
5.885	HCK	QUITO, ECUADOR, 50.98 m. 8-11 pm.
5.875	HRN	TEGUCIGALPA, HONDURAS, 51.06 m. 1.15-2.16, 8.30-10 pm.; Sun. 3.30-5.30, 8.30-9.30 pm.
5.855	HI1J	SAN PEDRO DE MACORIS, D. R., 51.25 m., Addr. Box 204. 12 m.-2 pm., 6.30-9 pm.
5.853	WOB	LAWRENCEVILLE, N. J., 51.26 m., Addr. A. T. & T. Co. Works Bermuda nights.
5.850	YV1RB	MARACAIBO, VEN., 51.28 m., Addr. Apartado 214. 8.45-9.45 am., 11.15 am.-12.15 pm., 4.45-9.45 pm.; Sun. 11.45 am.-12.45 pm.
5.830	TDD	SHINKYO, MANCHUKUO, 51.46 m. Works Tokio 6-9 am.
5.830	TIGPH	SAN JOSE, COSTA RICA, 51.5 m., Addr. Alma Tica, Apartado 800. 11 am.-1 pm., 6-10 pm. Relays TIX 9-10 pm.
5.800	YV5RC	CARACAS, VEN., 51.72 m., Addr. Radio Caracas. Sun 8.30-11.30 am., 1.30-10.30 pm. Daily 10.45 am.-1.30 pm., 4-10.30 pm.
5.790	JVU	NAZAKI, JAPAN, 51.81 m. Irregular.
5.780	OAX4D	LIMA, PERU, 51.9 m., Addr. P. O. Box 853. Mon., Wed. and Sat. 9-11.30 pm.
5.758	YNOP	MANAGUA, NICARAGUA, 52.11 m. 8-9.30 pm.
5.740	TGS	GUATEMALA CITY, GUAT., 52.26 m. Wed., Thur. and Sun. 6-9 pm.
5.730	HG1PM	QUITO, ECUADOR, 52.36 m. Irregular 10 pm.-12 m.
5.720	YV2RB	SAN CRISTOBAL, VEN., 52.45 m., Addr. La Voz de Tachira. 6-11.30 pm.
5.500	TI5HH	SAN RAMON, COSTA RICA, 54.55 m. Irregular 3.30-4, 8-11.30 pm.
5.145	PMY	BANDOENG, JAVA, 58.31 m. 5.30-11 am.
5.077	WCN	LAWRENCEVILLE, N. J., 59.08 m., Addr. A. T. & T. Co. Works England late at night irregularly.
5.025	ZFA	HAMILTON, BERMUDA, 59.7 m. Works N. Y. C. irregularly at night.
5.000	TFL	REYKJAVIK, ICELAND, 60 m. Works Europe nighttime irregularly.
4.975	GBC	RUGBY, ENG., 60.3 m. Works ships irregularly.
4.820	GDW	RUGBY, ENG., 62.24 m. Works N.Y.C. nighttime irregularly.

(Continued on page 149)

QUESTION BOX

EDITED BY G. W. SHUART, W2AMN

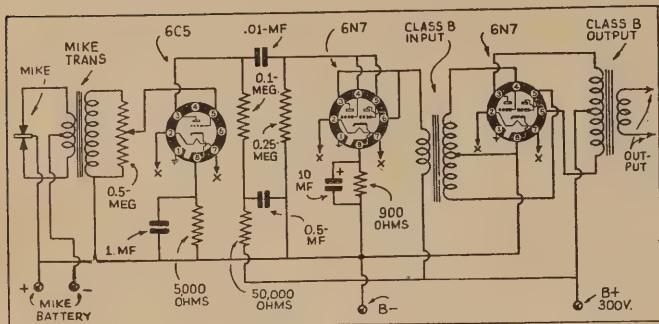
Because the amount of work involved in the drawing of diagrams and the compilation of data, we are forced to charge 25c each for letters that are answered directly through the mail. This fee includes only hand-drawn schematic drawings. We cannot furnish "picture-layouts"

or "full-sized" working drawings. Letters not accompanied by 25c will be answered in turn on this page. The 25c remittance may be made in the form of stamps, coin or money order.

Special problems involving considerable research will be quoted upon request. We cannot

offer opinions as to the relative merits of commercial instruments.

Correspondents are requested to write or print their names and addresses clearly. Hundreds of letters remain unanswered because of incomplete or illegible addresses.



Low Power Modulation (1072)

LOW-POWER MODULATOR

Richard Gulatsi, Jr., Mt. Vernon, N.Y.

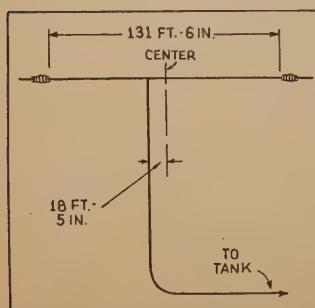
(Q.) Kindly print in the coming issue of the Question Box a diagram of a suitable modulator for the "W2AMN 5-Meter Mopa" described in the September, 1936, issue of *Short Wave & Television*. A double-button carbon microphone will be used, so please show input connections for this mike. This modulator should have an audio output of at least 18 watts. I leave the choice of tubes to you.

(A.) We have shown a diagram of a simple modulator which may be used with the "5-Meter Mopa." This modulator will have an output of slightly over 10 watts and will be thoroughly capable of modulating the 5-meter transmitter. All metal tubes are used. The design of the amplifier is extremely simple; its cost should be quite nominal. The gain control is located in the first tube, this control should be adjusted for best quality as indicated by the sound of the transmitted signal. The output winding of the class "B" transformer should be designed to work into an impedance of approximately 6,000 ohms, although anywhere from 5,000 to 6,000 ohms will work satisfactorily.

TRANSMITTING ANTENNA

R. Kobaryaski, Honolulu, T. H.

(Q.) I recently received your copy of the *Short Wave Guide*. I became immediately interested in the simplest "Ham" transmitter using an 802 tube described in it. However, I will appreciate it very much if you will print in the coming issue on the Question Box page, the type of, and the dimensions if possible, of an antenna system to be operated



Antenna (1073)

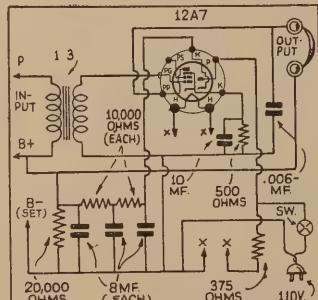
on the 3.5 mc. band, to go with the above transmitter.

(A.) We have shown data for an antenna which will work very nicely with the 1-tube transmitter described in the *Short Wave Guide*. This is a single wire flat top with a single wire feeder. The dimensions are given in the drawing. The feeder should run at right-angles to the antenna for distance equal to at least $\frac{1}{3}$ of the length of the antenna. The total length of the lead-in is not critical.

A.C.-D.C. AMPLIFIER

R. Patrick, Pullman, Wash.

(Q.) I am now using a 1-tube receiver and would like to build an A.C.-D.C. amplifier to be used in conjunction with it. Would you



Amplifier (1074)

kindly print the diagram showing how this could be done, and also show how the power supply for the A.C.-D.C. amplifier employing a 12A7 tube may be used to operate the other tube.

(A.) We have shown the complete diagram of a 12A7 pentode amplifier and rectifier combination. The power-supply portion may be used to furnish voltage for the other tube. We have not shown the other tube in the filament circuit. However, if you are using a 6.3 volt .3 amp heater tube this may also be connected in series with the 12A7 heater, and in this case the line cord resistor should have 20 ohms less resistance than that shown.

BEST TYPE COUPLING

Wm. E. Chenoweth, Hawarden, Ia.

(Q.) Will you please answer the following in your short-wave Question Box. Just which is the best type of coupling to use between the detector and the R.F. stage of a short-wave receiver.

(A.) The best method so far developed is the inductive method

which employs a separate winding for the plate circuit of the R. F. stage and another winding for the grid of the detector. Data on coils designed for this purpose can be found in the February, 1937, Question Box.

RECEIVER QRM

A SWL, Wollaston, Mass.

(Q.) I built a one-tube regenerative receiver using a 30-tube. I find that this set has a fierce output, audible for at least eight miles. The QRM was so noticeable that the "Ham" annoyed by it notified the F. C. C. in Boston. When I found out how serious this was and that the set acted so, I tore it down and I will build a set that has not these qualities. Please print this in your magazine so that the innocent listeners will not get into hot water with the Radio Inspectors. Please give some causes for the terrific output-signal regenerative circuits have, and, if possible, how to eliminate them.

(A.) We are all familiar with the "bloopers" used in the "old days," and the great amount of interference they caused, and it is only natural to expect the same on the short-waves. A partial remedy is to use very loose antenna coupling and plate voltage to the detector as low as is commensurate with efficient operation. Of course, the only real remedy is the addition of an R.F. stage between the antenna and the detector.

INSTALLING AN "R" METER

Francis Mulkern, Norwood, Mass.

(Q.) Will you please tell me how to add an "R" meter to a 2-tube regenerative receiver?

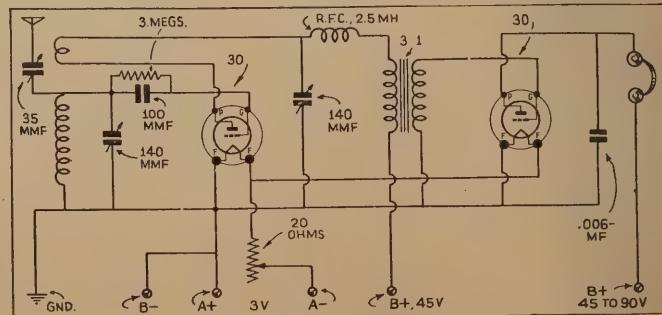
(A.) An "R" meter cannot successfully be used in conjunction with such a simple receiver. You will find an "R" meter in the more elaborate superheterodynes.

A SIMPLE 2-TUBER

Harry Campbell, Portland, Me.

(Q.) Would you please print a diagram for a 2-tube receiver similar to the Globe Trotter. I would also like to have the list of parts, together with their values. This receiver is to be battery-operated and should employ two type 30 tubes.

(A.) We have shown a circuit diagram of a conventional 2-tube battery set. This would require two 1½-volt dry cells for the filament supply and two 45-volt batteries for the plate supply. While the single 45-volt battery may be used, better results will be obtained with 90 volts applied to the plate of the amplifier tube.



A 2-Tube Battery Set (1076)

BEAT OSCILLATOR FOR BATTERY TYPE SUPER

A. A. Pinero, Buenos Aires, Argentina.

(Q.) In your December issue for 1936, page 470, there appeared a two-volt Super DX-4, which is a splendid receiver. However, I would like to add a beat oscillator to this receiver. The lead which goes to the beat oscillator is indicated in the diagram.

(A.) The beat oscillator diagram is shown. The connection from the plate of the type 30 oscillator goes to the lead indicated in the original diagram. A conventional beat oscillator transformer is used and is indicated by the dotted lines. This should respond to the same frequency as the L.F. transformers used in the receiver. A switch is located in the "B" lead for turning on and off the oscillator.

RADIO LAWS

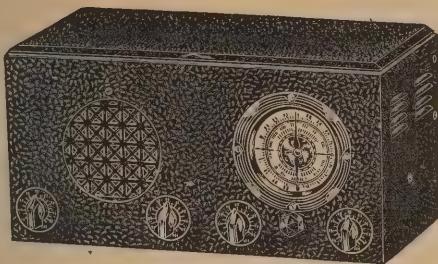
K. Mori, Sanger, Calif.

(Q.) The rule No. 380 states—An amateur radio station shall not be located upon premises controlled by an alien. This is the rule which appeared on the F. C. C. pamphlet; regarding this rule, is it lawful to buy a premise of my own from an alien and build a station on it, or is it lawful to build a station on a premise of a citizen?

(A.) You practically answered your own question when you stated that you're buying premises from an alien. Although we are not lawyers, we believe that so long as you, being a citizen, remain in control of the property, and being the rightful owner, that the alien proposition is no longer considered. We imagine the law refers to cases wherein aliens own the property or have a controlling interest in it in the form of a lease which would, of course, violate rule No. 380.

NEW 1937 SHORT WAVE APPARATUS

(PROMPT SHIPMENTS ON ALL ITEMS)



ER-19, complete, READY TO USE, with 7 RCA or Sylvania tubes, 12 low-loss silver plated coils for 8½ to 3000 meters, wired, in cabinet, and instructions.....

\$21.95

(If metal tubes are preferred over the glass type, add \$1 to above price.)

EILEN ER-19-B 7-tube BANDSPREAD BEAM POWER RECEIVER

(8½ to 3,000 meters)

Eilen

Our largest, greatest, and most sensitive new 1937 receiver, unequalled in appearance, performance and value. Uses a special highly efficient and selective circuit producing results which WILL satisfy even the most discriminating short wave fan.

ER-19 is equipped with the famous EILEN NOISE SUPPRESSOR, the latest development of our laboratories and which is skyrocketing itself into immense popularity. This remarkable development, exclusive with EILEN, enables you to enjoy reception from those far-off stations with excellent clarity and volume.

Constructed to the highest standards, to compete with the highest priced receivers on the market. This instrument uses two matched 6L6GC on 76, one 6L6, and one 5Y3 high gain tubes, as TUNED RF AMPLIFIER, TUNED ELECTRON COUPLED SCREEN-GRID REGENERATIVE DETECTOR, powerful 3 stage audio frequency amplifier with new beam amplifier tube, output stage delivering 5 watts peak of audio power to the built-in high fidelity dynamic loudspeaker. VARIABLE NOISE SUPPRESSOR, rectifier and complete built-in HUM-FREE power supply. BANDSPREAD—using a single electron beam circuit employing two types of plate controls certain types of noises occurring in all short wave receivers—automatic headphones jack—smooth and noiseless controls—POWERFUL hi-fidelity audio system—large, illuminated airplane type vernier dial—sensitivity, volume, and selectivity that will amaze you to find in a receiver of this price.

ER-19 is BEAUTIFUL as well as performance, is in a class by itself—heavy steel cabinet with hinged lid finished in durable black shrivel-colored dial lights behind black and white scale—chrome plated escutcheons—calibrated dial plates—plated chassis and shielding—Operates entirely from your 105 to 130 volts AC house current.

ER-19 under fair conditions will bring in dozens of foreign as well as domestic short wave stations with enormous volume. Order one and see for yourself.

For those who wish to build their own:

KIT of all parts, coils for 8½-3000 me. **\$14.95**

Cabinet, extra **.25**

7 matched Sylvania tubes, extra **3.35**

Wired and tested, extra **2.00**

AMATEURS: Model ER-19-B has same specifications as ER-19 except that it is equipped with plate voltage cut-off switch and special bandspread coils for 20-40-80-160 M bands spreading those bands 800 meters dial scale. Add \$1 to price of ER-19. (10 meter band coils if desired extra \$1.45.)

ER-19, complete, READY TO USE, with 7 RCA or Sylvania tubes,

\$21.95

12 low-loss silver plated coils for 8½ to 3000 meters, wired, in cabinet, and instructions.....

(If metal tubes are preferred over the glass type, add \$1 to above price.)



NEW! The HF-25 Beginner's Transmitter

An inexpensive transmitter capable of delivering a good 20 watts crystal power to the antenna on the 160, 80, 40 meter bands and 15 watts on 20 meter band. Using the new 6L6G in a Tri-Tet circuit allowing operation on two bands with one set of antenna and power supply. Operates on metal chassis housed in a beautiful chrome finished cabinet, antenna tuning unit built in. Eilen silvered transmitting dials. Triplett meter, including set cathode and plate tank coils for one band. Specially priced at **\$11.95**, in kit form including all parts necessary to put in operation except accessories listed below.

Extra: 6L6G \$1.25. Quartz crystal \$1.95 for 80, 160 meter band, 40 meter \$2.50. Crystal holder \$1.00. Coils for additional bands \$1.00 per set.

Eilen

BS-5

6-Tube Band switch Receiver

10 to 600 Meters

A powerful, sensitive, and selective SW receiver covering the entire wave-length span of 10 to 600 meters in 5 steps. NO PLUG-IN COILS are used. Simply turn the waveband selector switch and enjoy operation on any one of the five bands.

Uses two 6D6, one 76, one 4Z, one K42A, and one 25Z5 tubes as RF amplifier, electron coupled screen grid regenerative detector, powerful 2 stage audio amplifier with pentode output stage, rectifier and complete built-in power supply.

HUM-FREE—Hi-fidelity dynamic loudspeaker—illuminated airplane type metered dial—band spread tuning control—automatic headphones jack—extremely smooth acting controls—operates from your AC or DC house current—beautiful heavy, black shrivel finish chassis and cabinet.

DELIVERS GREAT LOUDSPEAKER VOLUME ON THE GREAT MAJORITY OF SHORT WAVE FOREIGN STATIONS UNDER FAIR CONDITIONS.

PRICE, complete with 6 tubes, cabinet, wired, and instructions, ready to use

BEAM POWER TUBES TO BE HAD

\$16.95

AMATEURS :

Model BS-5-AB has same specifications as BS-5 except that it has special bandspread circuit for 20-40-80-160 M bands and is equipped with plate voltage cut-off switch. Add \$1.00 to above price.



See editorial article Page 482, Dec. issue S.W.C.

7C 5-Tube Short Wave Receiver

8½ to 625 meters



Bigger and More Powerful Than Ever A Giant in Performance

FULL 6 TUBE PERFORMANCE plus THE NEW K92A SPEAKER TUBE makes this an outstanding value. Equipped with a powerful 3 stage audio frequency amplifier.

Uses 6D6-6F7 (twin 2 in 1 tube)—7K92A-12A7 (twin tube) tubes as R.F. amplifier, electron coupled screen grid regenerative detector, power stage and audio amplifier with pentode output stage, rectifier and complete built-in power supply. Operates entirely from 105 to 130 volt AC or DC light socket.

BAND SPREAD TUNING—smooth regeneration control, built-in light quality headphones, automatic headphones jack—large low-loss inductances. Heavy, black shrivel finish metal chassis and cabinet. Must be seen to be appreciated. Satisfied owners report as high as 85 countries on the loudspeaker with this model. You may do the same under fair conditions. ORDER YOURS TODAY! YOU WILL NOT REGRET IT!

EILEN 7C RECEIVER, wired, in cabinet, complete, READY TO USE, with speaker 5 RCA tubes, 4 coils for 8½ to 200 meters, and instructions..... **\$12.95**

Special loudspeaker..... **1.25**

2 Broadcast band coils, extra..... **1.45**

7C KIT, unwired, of necessary parts, 4 coils for 8½ to 200 meters, and instructions less cabinet, speaker, tubes..... **\$7.25**

Beautiful metal cabinet, extra..... **1.25**

Broadcast band coils, extra..... **1.45**

Special loudspeaker..... **1.45**

(2) Broadcast band coils, 200-625 meters..... **1.25**

Labor for wiring & testing, extra..... **1.50**

SPECIAL: COMPLETE KIT, unwired, cabinet, speaker, 4 coils for 8½ to 200 meters, and simple instructions..... **\$11.45**

2 broadcast coils, extra..... **1.25**

AMATEURS: Model 7C-AB, same specifications as 7C except that it has special tuning circuit and coils for spreading on the 20-40-80-160 M bands over 80% of dial. Also includes a special plate voltage cut-off switch. Same price as 7C. Model 6B or 6B-AB battery model of 7C. Operates from inexpensive dry batteries. Same price.



3-Tube Short Wave Radio Only **\$3.25**

(less tubes, phones, unwired)

A dependable receiver which is guaranteed to give results. Operates entirely from the AC or DC house current. Simple to build and easy to operate. Beautiful, black shrivel finish cabinet and instructions furnished. Wavelength range 12-600 meters. An ideal set for the beginner who wishes to learn the thrill of short wave reception.

THREE TUBE BATTERY SET, less tubes, phones, unwired..... **\$10.95**

TWO TUBE BATTERY SET, less tubes, phones, unwired..... **\$14.95**

(If metal tubes are preferred to glass type, add \$1)



AN-5 Four Tube BANDSPREAD RECEIVER

A powerful and highly selective short wave receiver designed for the radio amateur who prefers the use of headphones.

Uses 6F7-6D6-76-84 tubes in five-tube performance circuit as TUNED RF amplifier.

TUNED electron coupled screen grid regenerative detector, two stage audio amplifier, rectifier & built-in power supply. HUM-FREE. POWERFUL. Ready to operate a speaker. Operates from your 105-130 volt AC house current.

AN-5, complete with 4 matched tubes, coils for 9 to 200 meters, cabinet, wired, ready for use..... **\$15.95**

Broadcast band coils (2), extra..... **1.45**

Speaker..... **1.45**

2 Broadcast band coils, extra..... **1.45**

Labor for wiring & testing, extra..... **1.50**

SPECIAL: COMPLETE KIT, unwired, cabinet, speaker, 4 coils for 8½ to 200 meters, and simple instructions..... **\$11.45**

2 broadcast coils, extra..... **1.25**

Beautiful metal cabinet, extra..... **1.25**

Broadcast band coils, extra..... **1.45**

Special loudspeaker..... **1.45**

(2) Broadcast band coils, 200-625 meters..... **1.25**

Labor for wiring & testing, extra..... **1.50**

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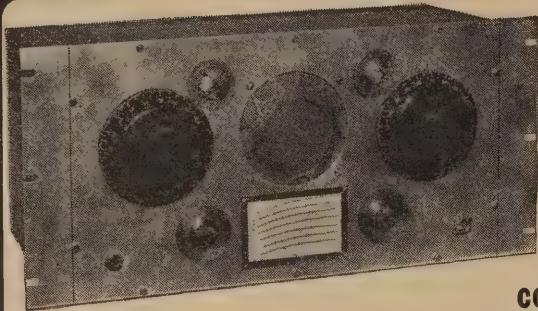
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Labor for wiring & testing, extra..... **1.50**

SPECIAL: COMPLETE KIT, unwired, cabinet, speaker, 4 coils for 8½ to 200 meters, and simple instructions..... **\$11.45**

2 broadcast coils,

A "WORLD-BEATER"



The NEW ACE DO-ALL SEVEN TUBE HIGH PERFORMANCE COMMUNICATIONS RECEIVER

**The ONLY Receiver incorporating
ALL of these DESIRABLE FEATURES!**

● TWO TUNED STAGES

A positive necessity for extreme sensitivity and "split-hair" selectivity.

● 2½ to 3000 METERS

Your Do-All is never obsolete. It tunes to all bands! Today and tomorrow!

● BEAM POWER

New GL6 Beam Power tube makes available 6 Watts Clear, crisp audio output.

● LATEST TUBES

6K7—Tuned R.F. Amplifier.
6K7—Tuned electron coupled regenerative detector.
76—U.H.F. 2½ to 10 meter super regenerative detector.
76—6C5G-6L6G High Fidelity three stage audio power Amplifier.
5Y4G—Full wave, high voltage rectifier.

● HEAD PHONE JACK

Automatic, complete speaker cut-off

● HIGH FIDELITY SPEAKER

Full size, heavy dynamic speaker, accurately matched for maximum power and quality.

● FULL BANDSPREAD

Separates those weaker foreign stations!

● NOISE SUPPRESSOR

A remarkable development pioneered by Ace Laboratories. Positive switch control suppresses interference noises bringing out the foreign stations with tremendous volume.

● AND—

Velvet smooth calibrated controls—Doublet or single antenna input—Self contained, **NOUTLESS** power Supply—Metal tubes for lower background noise level—Panel illumination. Sensitivity, power, selectivity, quality surpassed by none!

See back issues of Short Wave and Television—send for literature—or better yet order your Do-All right now—and thrill to a new and keener kind of radio reception. We know you'll be amazed!

FOR COMPLETE DETAILS

DO-ALL DELUXE

STANDARD MODEL (9 to 3000 Meters)

Six tube Receiver, complete with matched tubes, and cabinet. Nothing else to buy! (Not wired)

\$19.75

Laboratory wired and tested, ready for you to attach antenna plug into socket, and thrill to new and strange programmes! Price.....

\$21.75

If tubes, cabinet, and 200 to 3000 meter wavelength range are not desired at present you may deduct from the above prices.

\$5.00

DO-ALL DELUXE

ULTRA MODEL (2½ to 3000 Meters)

Seven tube Receiver, complete with matched tubes and cabinet. Ready to be wired.

\$23.75

Laboratory wired and tested, ready to operate. The entire world of Radio at your command! Complete

\$26.25

If tubes, cabinet, and 200 to 3000 meter wavelength range are not desired at present you may deduct from the above prices.

\$5.00

BATTERY OPERATION FOR VACATION, CAMP, MOBILE WITH THE ACE "UNIVERSAL-SIX"

IMAGINE! A compact, self contained, sensitive receiver with real SIX TUBE performance that will operate on any AC or DC house line. Simply plug in a cable and—PRESTO! a completely battery operated set that you can use in your car, boat, or any other place! The same full toned loud speaker volume—the same thrilling foreign reception—the same ease of operation! No changes in wiring. Really TWO receivers for less than you would expect to pay for only one!

Look at this powerful tube line-up: Screen grid pentode RF stage—high gain resonant detector—THREE STAGE high quality audio amplification with power pentode output—heater type rectifier and humless power supply. **FULL SIX TUBE POWER** from two dual "Twin" 6E7 tubes and heavy duty 38 and 1-TV tubes!

And these features: Full bandspread 9½ to 625 meters—self contained, good quality loud speaker—New Transmitter type tuning dial with dual speed friction drive—Provision for headphones—Indirect panel illumination—Velvet smooth control of regeneration—operation entirely from any AC or DC house socket OR ON BATTERIES. Low current drain means long, economical life of tubes and batteries.

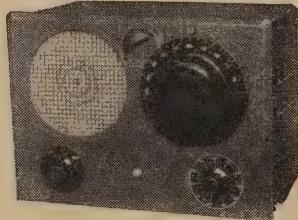
This receiver is easy to build—easy to operate—and it certainly pulls 'em in!! Order your Universal Six now! You will be amazed at the full loud speaker volume of distant stations! Every set is fully guaranteed. Buy with safety!

FOR HOME, HOTEL, PORTABLE
DO-ALL DELUXE
ULTRA MODEL (2½ to 3000 Meters)

Four tube Receiver, cabinet, all coils, and built-in speaker. COMPLETE, nothing else to buy. Not wired.

\$12.75

Laboratory wired and tested, complete, \$14.50



ACE UNIVERSAL-SIX
receiver with four tubes, cabinet, all coils, and built-in speaker. COMPLETE, nothing else to buy. Not wired.

\$12.75

Laboratory wired and tested, complete, \$14.50

QUALITY ACE RADIO LABORATORIES VALUE
227 GREENWICH ST., Dept. C-7, NEW YORK CITY

See page 154 for the 6 Best Books on Short Waves

Manufacturers of
VITREOUS TRANSMITTING GRID LEAKS
VOLUME CONTROLS • POWER RHEOSTATS

Write for Complete Free Catalog
ELECTRAD, Inc.
175 Varick Street, New York

**CHASSIS—CABINETS
PANELS & CANS**
STANDARD SIZES ON HAND
SPECIAL SIZES MADE TO ORDER
KORROL RADIO PRODUCTS CO.
Dept. S-7
232 Greenwich St., New York City

SHORT WAVE LEAGUE

Hugo Gernsback
Executive Secretary

Here's Your Button

The illustration here-with shows the beautiful design of the "Official" Short Wave League button, which is available to everyone who becomes a member of the Short Wave League.

The requirements for joining the League are explained in a booklet, copies of which will be mailed upon request. The button measures $\frac{3}{4}$ inch in diameter and is inlaid in enamel—3 colors—red, white, and blue.



Please note that you can order your button AT ONCE—SHORT WAVE LEAGUE supplies it at cost, the price, including the mailing, being 35 cents. A solid gold button is furnished for \$2.00 prepaid. Address all communications to SHORT WAVE LEAGUE, 99-101 Hudson St., New York.

When To Listen In By M. Harvey Gernsback

All Schedules Eastern Standard Time

DAVENTRY

THE new high-power transmitters at Daventry are now in regular service. Three transmitters, each of 50 kw. (50,000 watts) output are available for simultaneous use. In addition the old G5SW transmitter has had a power-stage added, which raises its output to 25 kw. The two old 10 kw. stations are still in commission. The operating schedule calls for simultaneous operation on 4 frequencies in each transmission. The extra transmitters (the two 10 kw. units) will not be used normally. For schedules see station list.

GERMANY

A station calling itself "the voice of the German Communist Party" is heard from 4-5 p.m. on 10.07 and 9.850 mc. No location is given in the announcements but it is supposed to be operating secretly in Germany. Signals are very strong from this "mystery" station.

PANAMA

A new station is now operating in Panama City. Call is HP5A. The station operates on 6.12 mc. The tentative schedule is 12n-1 p.m., 8-10 p.m. Address P.O. Box 58.

GUATEMALA

TG2 at Guatemala City is supposed to be "on the air" after the first of May, according to a letter from the chief engineer. The operating schedule is from 11 p.m. to 1 a.m. on 6.31 mc. Address Secretaria de Fomento.

SWEDEN

SM5SX at Stockholm has discontinued operations on 11.71 mc. In its place SBG at Motala relays the Stockholm broadcast station daily from 9 a.m.-1:30 p.m. on 11.71 mc., and from 1:30-6 p.m. on 6.065 mc.

BALTIMORE

W3XKEY is operating on 31.6 mc. daily from 4 p.m.-12 m. It relays the programs of WFBR. Location is Baltimore, Md.

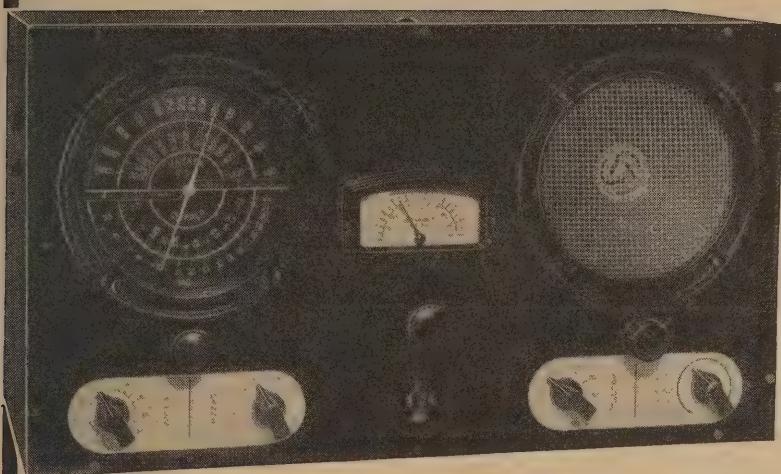
MILWAUKEE

A newcomer to the 11 meter broadcast band is W9XAZ at Milwaukee, Wis. This station broadcasts daily from 1 p.m. on and relays WTMJ. Owner is The Journal Co. W9XAZ; operates on 24.6 mc.

CHILE

The call letters of the Santiago station on 12.3 mc. are CEB, according to latest reports at hand.

8 BANDS



ASK THE MAN WHO OWNS ONE

A BEAUTIFUL communication receiver in both appearance and operation. Five tubes always in full use with R.F. amplification on all frequencies. Uses the genuine Haynes electron coupled regenerative-super-regenerative circuit which means that it really "goes to town" on the high frequency bands. Tube line-up is: 6K7 RF amplifier, 6J5G regenerative and super-regenerative detector, 6J5G first audio amplifier, 6L6G power output, 80 rectifier.

THE NEW 2½ to 560 Meters DX-4

4-TUBE SHORT WAVE RECEIVER

If you are interested in REAL long distance reception—if you want a specialized short wave receiver which can reach out and pull in, not only the ordinary Europeans but those hard to get little fellows in the out-of-the-way corners of the world—and if you do not own such a receiver because heretofore you could not afford it, YOUR PROBLEM IS SOLVED! For the first time in radio history such a receiver is now available at a truly low price. The DX-4 has what it takes: Band switching, Beam power output tube, 6J5G regenerative and super-regenerative detector, Dynamic speaker, Full AC operation with 80 rectifier, Tremendous electrical bandspread. SELECTIVITY, SENSITIVITY and POWER.



RADIO CONSTRUCTORS LABORATORIES
Dept. SW-7, 136 LIBERTY ST., NEW YORK, N. Y.



ON THE NEW HAYNES

5 TUBE

R-S-R CLIPPER 3 TO 1600 METERS

WITH

**VERNIER BANDSPREAD OVER
THIS WHOLE TREMENDOUS
RANGE**

- * Beam power output with 6" dynamic speaker.
- * Separate tone, sensitivity and volume controls.
- * Bands switching (no plug-in coils) down to 14 meters.
- * Removable air-wound coils for the ultra-high frequencies.
- * Regeneration control that is absolutely smooth and free from tuning interaction.
- * 5-inch main tuning dial, calibrated in kilocycles.
- * Perfect super-regenerative control on the ultra-frequencies.

Complete with five Sylvania tubes, ready to operate from any 110 volt AC line...

\$28.85

Shipping weight 30 lbs.



HERE IS A REVOLUTIONARY NEW RECEIVER

which actually gives the results you want on long distance foreign reception at a price that is absolutely without precedent. Complete with four Sylvania tubes ready to operate from any 110 volt line.....

\$17.85

Shipping weight 18 lbs.

Televisual Use of Ultra-High Frequencies

By Dr. A. N. Goldsmith

(Continued from page 115)

cycles) be used for television appears to be a wise suggestion.

The televisual use of these ultra-high-frequencies is certain to bring about a revolution in radio technique. Hardly anything looks the same or acts the same at these frequencies, as at the much lower frequencies which have previously been used.

The television pick-up is of course an extremely novel device which looks like a fantastic camera and contains a sensitive televisual pick-up tube in place of a photographic plate. The amplification of the video frequencies which are produced by the pick-up camera requires wide-band operation on a hitherto undreamed-of basis. Thus, where 10-kilicycle modulation was regarded as

quite a problem in present day broadcasting, 2,000-kilicycle or higher modulation must be commonplace for television pictures of good quality. Oscillators and modulators for these frequencies are also electrical puzzles, and it has taken the utmost resourcefulness of the development engineer to produce adequate equipment of this type. The vacuum tubes which are used at such high frequencies require a design where inter-electrode capacities are made vanishingly small, and where every material is worked to the limit, consistent with its capacities. The construction of the pick-up tubes for the television camera has presented an entirely new array of problems, as has also the construction of the

receiving cathode-ray tubes. In fact, there has sprung up an entirely new branch of science known as "electron optics," the laws and procedure of which are required to enable satisfactory pick-up and reproduction in television. There is one very encouraging aspect about the *televisual* use of the *ultra-high-frequencies*. With its myriad of problems, many of which are as yet only partially solved, it provides rich material for the ambitious and skilled experimenter and development engineer. Here we have a job which will last over decades and which will offer a remarkable successful opportunity to make some careers in a new field which is bound to prove of major interest to humanity.

WHAT HAS HARRISON?

Everything for the Ham!!

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HAMMARLUND
HAYNES
NATIONAL
PATTERSON
RME
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Easy Time Payments.

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AMPEREX
EIMAC
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TAYLOR, Etc.

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Every part that is made—
HARRISON HAS IT!
Or we'll get it for you—
quickly!

QUALITY—the Highest
SERVICE—the Finest
VALUE at Lowest Prices!

HARRISON RADIO CO.
"THE FRIENDLY AMATEUR SUPPLY HOUSE"
12 WEST BROADWAY
NEW YORK CITY

DEPENDABLE



ECONOMICAL

MODERN

KEN-O-TAP

The Practical Solution to the Modulation Problem

KEN-O-DRIVE

The Modern Answer to Critical Driver Operation

KEN-O-DYNE

The Precision Method of Matching Output Tubes to Speakers

KEN-O-LINE

The Efficient Coupling Device from Universal Line

Ask your dealer for a free copy of our revised 16 page T line catalog. Contains a large selection of modern audio circuits ranging in power output from four to 120 watts. These circuits feature Beam Power Tubes, Inverse Feed-Back and Cathode Drivers which provide the ultimate in audio design.

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Simontrice,
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Harrison offers—

**THIS MONTH'S
SPECIAL**

**BEAM POWER TUBES
6L6—69¢**

GLASS

Brand new, fully tested, finest quality. This remarkable tube is used in most all modern transmitters and P.A. Amplifiers. High output! Octal base, glass bulb.

Only a fortunate purchase enables us to sell these excellent, transmitter tested tubes at this amazing price!

List Price \$2.50. Every tube is fully guaranteed for 30 days! At this low price we cannot mention the name of the manufacturer—one of the largest and most reputable!

(ORDERS FOR FOUR OR MORE TUBES SHIPPED PREPAID)

BUY NOW AND BUY PLENTY!

You'll Never See Prices This Low Again!

ORDER EVERYTHING
YOU NEED — NOW!

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"THE FRIENDLY AMATEUR SUPPLY HOUSE"

12 WEST BROADWAY
NEW YORK CITY



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**CRYSTAL MICROPHONES
WITH TWO NEW FEATURES**

The Special Astatic Plug and Socket Connector which permits instant interchange of microphones on the same cable or permits the use of several lengths of cable on the same microphone. PLUS the new Astatic Spring Cable Protector which prevents cable breakage at mounting.

SEE YOUR ASTATIC JOBBER

Licensed under Brush Development Company Patents, Astatic pending.

ASTATIC Microphone Laboratories, Inc.
DEPT. SW YOUNGSTOWN, OHIO

BLILEY CRYSTALS

20-40-80-160 Meter Bands
\$3.95 up.

Bliley Electric Co., Erie, Pa.

**Eye and Ear "Signals"
Tell Pilot He Passed
Beacon**

(Continued from page 119)

of transmitting antennas were tried in an attempt to obtain a marker pattern free of dead spots or lobes and having a circular shape. It was also desired to have the pattern size several times larger than the cone of silence of the range station at 3,000 feet and fairly uniform in size above 3,000 feet altitude.

The antenna array which gave these desired features proved to be quite simple in construction and adjustment, as will be observed in figures 3, 4 and 5. The pattern of this array spreads quite rapidly up to 3,000 feet and then remains nearly constant up to its top at about 9,000 feet. At 3,000 feet altitude and a ground speed of 100 m. p. h. the signals last approx. 27 sec.

The pattern, expressed in feet, is shown in curves, figures 6 and 7. It should be mentioned that there is some apparent displacement of the pattern in actual flight over that shown in the curves. The pattern of the receiving antenna on the ship and slight mechanical delay in the receiver relay cause the marker indicator lamp to delay in lighting until the ship is nearly over the range station. The curves of figures 9 and 10 were based on time of marker signal indication only and were obtained by approaching and flying directly over the station from several directions, immediately retracing each direction and averaging the two indications.

The pattern size and height are a function of both transmitter power and receiver sensitivity. The receiver sensitivity involves also the effective height of the receiving antenna. In the tests made by the Bureau the receiving antenna consisted of a single 65-inch wire running longitudinally 7 inches below the fabric belly of the ship and connected to the receiver by means of a 43-inch unshielded lead-in. During development the receiver sensitivity was reduced until it would not respond to various ultra high and broadcast frequency signals encountered in the vicinity of Washington, D. C. The proper sensitivity was about 460 microvolts. Then a good band pass filter at 3,000 cycles was added in the output circuit.

With the foregoing receiving conditions established the power of the transmitter was adjusted until the pattern size represented here was obtained. Obviously it is possible to provide, by increase of power and some sacrifice in narrowness at lower altitudes, a marker pattern extending above 9,000 feet for special locations.

The transmitting antenna array consists of four horizontal half-wave doublets supported one-fourth wave above ground and pointing in four directions from a common center. These four antennas are excited at the common center through a special arrangement of down leads that provides balanced currents in all four antennas and a phase difference of 90 electrical degrees between the currents in adjacent antennas. To properly monitor the operation of this antenna and transmitter some of the radio frequency signal is rectified and filtered and coupled to the control line leading from the range station to the control station at the airport. At the control station the signal is used to operate a meter which clearly indicates to the operator the condition of the transmitting equipment.

In looking forward it is anticipated that ultra-high frequencies will be used very extensively throughout the country for a variety of services. It is obvious that if other services are given frequency assignments very close to the 75 megacycle marker frequency some interference might result in the use of the present receivers. Crystal-controlled superheterodyne receivers will require higher frequency stability in the marker transmitters than that now afforded. The Bureau is experimenting with crystal-controlled superheterodyne receivers and concentric line- and crystal-controlled transmitters. It is believed that this equipment will meet all future selectivity and stability requirements.

The ULTIMATE in U-H-F. PRODUCTS

ULTRA DUPLEX 5 TUBE BATTERY PORTABLE

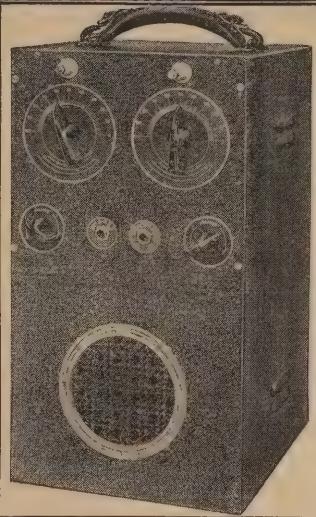
2½ to 5 Meters (56 to 120 M.C.)

NEW TUBES, NEW CIRCUIT, the ideal complete station for portable use. Receiver and transmitter absolutely independent of each other. Receiver uses 1-19, 1-1F5G, as detector, 1st and 2nd stage of A.F. Transmitter uses 1-19, oscillator, 1-1E5G speech amplifier, 1-1E7G class A modulator. Past proven performance together with the addition of several up to the minute features insures superb results. Separate antennas are used for receiver and transmitter to obtain the peak of efficiency for both units regardless of frequency settings. Supplied complete with all coils including coil for 10 meter reception.

- 19-1F5G—19-1E5G—
1E7G
- Built in Wright DeCoster
Nokoil Speaker
- Extremely low current
drain
- 100% class A plate modula-
tion
- Negligible receiver radia-
tion
- Receiver or transmitter
may be turned off when not
in use
- Great usable sensitivity
- Automatic phone jack

Complete with built in Nokoil speaker and cabinet with battery compartment, wired and tested, less tubes, batteries, microphone and antenna \$20.95

Set of 5 Sylvania tube \$4.62
American S.B. hand mike 2.95
Adjustable 8 ft. antenna 1.60



ULTRA DUPLEX 6 TUBE MOBILE OR A.C.

2½ to 5 Meters (56 to 120 M.C.)

This unit uses six of the latest 6 volt tubes in a circuit which may be operated from a 6 volt automobile battery or by substituting power supplies from 110 volts A.C. Receiver uses 1-6J5G as a super-sensitive detector, 1-6J7 1st A.F. stage, 1-6F6 output stage. Transmitter consists of 1-6E6 oscillator, 1-6J7 speech amplifier, 1-6L6 class A modulator. Power output of transmitter is 10 watts 100% plate modulated. Separate antennas are used for peak efficiency of both units regardless of frequency settings. Changeover from 6 volt to A.C. operation is extremely simple. All that is necessary is to remove the built in generator and insert the A.C. power supply.

Supplied complete with all coils including coil for 10 meter reception.

- 6J5G—6J7—6F6—6E6—6J7—
6L6
- Built in 350 volt 150 mil
filtered generator
- Built in dynamic speaker
- 10 watts power output
- 100% plate modulation
- Absolutely independent re-
ceiver and transmitter
- Negligible receiver radia-
tion
- Automatic phone jack

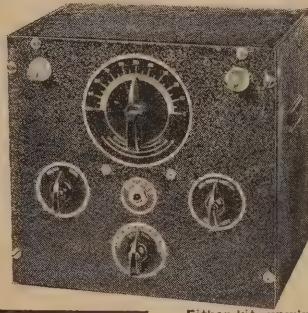
Ultra 6 tube Duplex complete,
with built in dynamic speaker,
and A.C. power supply, wired &
tested, with cabinet, less tubes
and antenna \$28.90

Set of 6 Sylvania tubes \$38.45
American S.B. hand mike 2.95
Adjustable 8 ft. antenna 1.60

SENSATIONAL ULTRA "SKY ROVER" 2-TUBE TRANS-RECEIVERS

A.C.-D.C. MODEL

Numerous letters of appreciation received from the many purchasers of the Ultra Sky Rover since its release a few months ago pronounces it as the sensation of the year. Never before was a unit of this type available at any price. This compact and self-contained unit will receive from 2½ to 4000 meters with a high degree of excellence. Will receive foreign stations, amateurs, police calls, broadcast, press, airplane and weather reports, time signals, and all ultra high frequency stations. As a 2½ to 5 meter transmitter surprising results will be obtained when calling friends from afar.



BATTERY MODEL

In compliance with countless requests we have designed a battery model of the now famous A.C.-D.C. Skyrover. This remarkable unit uses 2 twin tubes, 19 & 1E7G which insure consistent loudspeaker volume and powerful transmission. Receives from 2½ to 4000 meters, transmits on 2½ and 5 meters. Cabinet is provided with handle (not shown) for portable use. May also be mounted in a car. The same features which characterize the electric model are incorporated in this unit.

\$6.45
Either kit, unwired, less tubes and accessories
Set of 2 Sylvania tubes for electric model
6J5G and 12A7 \$1.65
Set of 2 Sylvania tubes for battery model
19 and 1E7G \$1.95
Set of 4 coils 2½ to 15 meters 30c
Set of 4 coils 15 to 200 meters 95c
Set of 5 coils 200 to 4000 meters \$1.75
American S.B. Handmike 2.95
Cabinet less battery compartment 95c
Cabinet with battery and speaker compartment \$2.25
5-inch magnetic speaker \$1.25
Wired and tested \$2.00

3-Tube Portable Transceiver (2½ VO 5 METERS)

(Built-in Loud Speaker)

A compact powerful 2½ & 5 meter portable transceiver designed for loud speaker operation, is now available in the Ultra 3 P. This remarkable unit will be found capable of maintaining positive contact when communication is once established. Class A 100% modulation is employed. This has been made possible by the new 2 Volt tubes; 1F4 Class A modulator—1R4, high gain speech amplifier. These together with a 19 tube, Oscillator-Super regenerative detector result in an ideal transceiver. When used as a receiver loud speaker volume is assured. Plate modulation.

Supplied complete with all coils, including coil for 10 meter reception.



Complete kit of parts (including all coils), less batteries, tubes, speaker, microphone and cabinet unwired \$9.95
Wired and tested \$2.50
Sylvania 19-1F4, 1H4 set of 3 matched tubes \$2.50
Cabinet with built-in speaker and battery compartment 2.25
Cabinet less built-in speaker with battery 1.95
Cabinet less built-in speaker, less battery compartment 1.10
American S.B. Handmike 2.95
Matched speaker 1.25

Ultra High Frequency Products Co., 123 Liberty St., New York

Simple 1-Tube Booster Aids "DX" Fan

(Continued from page 121)

antenna. While they will work to some extent, they will not provide as efficient operation as the spaced pair. The spacing on either type of antenna may be from two to six inches. The two-inch type insulator or transposition block would seem to be the best arrangement. The remaining antenna shown in the diagram is a half-wave antenna with a single-wire feed system. The distance between the center of the antenna and the point at which

the lead-in is attached should be equal to 14% of the total length of the antenna. With this antenna one connection of the input coil is grounded as shown in the diagram.

The operation of this amplifier is exactly the same as a regenerative detector—however the tube is never permitted to oscillate. This means that the regeneration control should always be set below the point where the tube breaks into oscillation. The mechanical details are shown in the photograph, and should offer no difficulty to the constructor.

Parts List for Booster

HAMMARLUND

- 1—midget 140 mmf. variable condenser (HF)
- 1—5 prong isolantite socket
- 4—small isolantite coil forms (CF-M)
- 1—6 prong isolantite socket
- 1—2.1 mh. R.F.

SPRAGUE

- 3—1 mf. by-pass condensers
- 1—100 mmf. condenser
- I. R. C.
- 1—500 ohm ½-watt resistor
- 1—.1 meg. ½-watt resistor
- 1—50,000 ohm potentiometer

Bottom View

RAYTHEON

1—6D6 or 57 tube.

COIL DATA

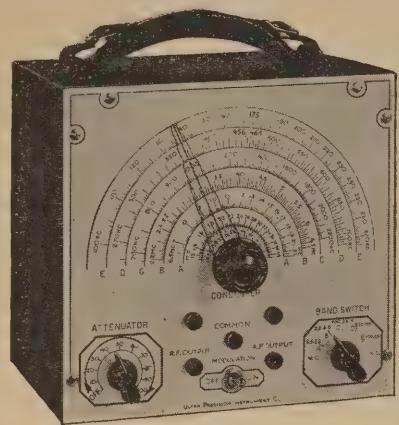
- No. 1—5 turns No. 24 osc. close wound, tap at 1 turn
- No. 2—10 turns No. 24 osc. close wound, tap at 1 turn
- No. 3—24 turns No. 24 osc. close wound, tap at 2 turns
- No. 4—45 turns No. 24 osc. close wound, tap at 2 turns

The antenna coil is not critical and may consist of 2-5 turns, the smaller number used with the twisted feeders and the larger with the spaced feeders.

\$25.00 FOR GOOD 1-TUBE SET

WE are offering \$25.00 for a good 1-tube set, either in the form of a short-wave receiver or a converter. Please note that there is little use in sending in an ordinary hook-up for a 3-element tube as most of the circuits possible with these tubes have been published.

What the editors want is a new circuit designed around one of the latest type tubes having a multiplicity of grids.



ULTRA MODEL 1A1 Precision Signal Generator

- Wide range 100 K.C. to 66 M.C. (3000 to 4.5 meters).
- Direct reading dial accurately calibrated for entire range.
- Accuracy of calibration $\frac{1}{2}$ of 1% on I.F. and broadcast bands, 1% on short wave bands.
- High ratio vernier dial drive with hair splitting pointer.
- Separate outputs for both R.F. and audio.
- Attenuator for both R.F. and audio channels.
- Modulated or unmodulated R.F.
- Pure sine wave audio output.
- Due to pure wave form of both R.F. and audio outputs the unit may be used in conjunction with an oscilloscope.
- Tests condensers for opens and shorts by pitch method.
- Outstanding appearance. Unit has beautifully etched metal panel.
- A.C. and D.C. operation. Any cycle.
- Supplied for 110 volt A.C. and D.C. operation. May be supplied for any operating voltage from 110 volts up, on request at no extra charge.

Model 1A1 Precision signal generator supplied complete with tubes, cabinet, and operating instructions as illustrated and described

ULTRA PRECISION A.C.-D.C. PORTABLE ALLTEST METER

- OHMMETER.
- A.C.-D.C. volt milliammeter (2000 ohms per volt).
- Accuracy of A.C. readings linear regardless of frequency, waveform, or temperature.
- Completely self contained for all ranges (no external batteries or plugging into power line required).
- Built-in tube rectifier.
- D'Arsonval jeweled movement (500 micro-amperes).
- Overall accuracy on A.C. or D.C. 2%.
- VOLTS—0.5, —0.50, 0.250, 0-1000.
- MILS—0-1, —0.5, 0-250, 0-1000.
- OHMS—0-200, 0-200,000, 0-2 meg.
- Large easy to read scales with knife edge pointer.
- May be used as field strength meter.

ULTRA PRECISION INSTRUMENTS CO.

123 Liberty St.,

Dept. S-1,

New York City

\$12⁵⁰



\$13⁹⁵

ULTRA PRECISION A.C.-D.C.
PORTABLE ALL-
TESTMETER as illus-
trated complete with
two 7½ volt Burgess
batteries, built-in tube
rectifier, and operating
instructions.....

Over 35,000 Set Builders Use This SHORT WAVE COIL BOOK

Every experimenter who has ever tried to build a short wave set knows only too well by experience, that the difference between a good and a poor receiver is usually found in the short wave coils. Very often you have to hunt through copies of magazines, books, etc., to find the information you require about coil winding.

Between the two covers of this book you now find every possible bit of information on coil winding that has appeared in print during the past two years.

Illustrations galore, giving full instructions how to wind coils, dimensions, size of wire, spacing, how to plot them, by means of which any coil for any particular short wave set can be figured in advance, as to number of turns, size of wire, spacing, etc.

There has never been such data published in such easy accessible form as this.

PRICE 25c PREPAID

For a copy of this handy book, send 25c U. S. coin or unused U. S. Postage Stamps to

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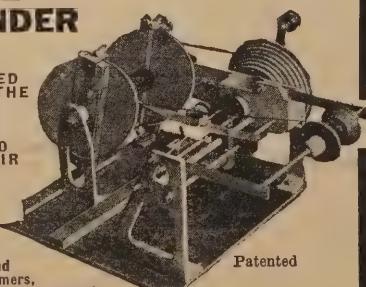
SHORT WAVE COIL BOOK

Short Wave Coil Data
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Short Wave Receiver
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SIGNED
FOR THE
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Will wind
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Straight or Honeycomb
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armatures. Revolution recorder. 14 Speed changes.

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For Building the Following Treasure
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- No. 1. Hughes Induction Balance Circuit
- No. 2. Sensitive Hughes Induction Balance Circuit
- No. 3. Single Super-Sensitive Hughes Induction Balance Circuit
- No. 4. Radio Frequency Oscillator Circuit
- No. 5. Audio Frequency Oscillator Circuit
- No. 6. Combination Radio Transmitter and Receiver Circuit

With any one of these systems you can construct instruments to locate buried treasures, metal war relics, mineral deposits, subterranean water veins, buried gas and water pipes, lost objects, tools and treasures sunken in water, etc.

For each set of blueprints and
instructions \$1.00

The complete set of six folders \$5.00
(Sent postpaid)

TECHNIFAX

Division 77-W

558 W. WASHINGTON BLVD. CHICAGO, ILL.

40 Watt Transmitter

(Continued from page 124)

rent of the final amplifier.

The oscillator coil L-1 consists of 30 turns of No. 20 enameled wire, space-wound on a 1½-inch diameter form. The amplifier coil, L-2 consists of 50 turns of No. 20 enameled wire space-wound on a 2½-inch diameter form tapped at the twenty-fifth turn. Actually, only 25 turns are employed in the plate tuned circuit.

The method of adjusting the transmitter is very simple. With a dummy plug in the amplifier plate-circuit jack (this plug may consist of a piece of ¼-inch bakelite rod, rounded off on the end so that it will fit in the jack and remove plate voltage from the tube) and the filaments heated, we can turn on the plate voltage switch. This will apply voltage to the oscillator only. The meter plug should be inserted in the plate jack of the oscillator. Next rotate the variable condenser C-5, which is the oscillator tuning condenser until a decided dip is indicated in the meter reading. Adjust the variable condenser slightly to the high-frequency side of this dip. The oscillator is now functioning properly.

If we plug the meter jack into the grid circuit of the amplifier, we will note a sizeable grid current. With condenser C-6 set at a minimum capacity, rotate condenser C-7 until a decided change is noticed in the grid current of the amplifier tube. Then increase the capacity of C-6, the neutralizing condenser gradually; at the same time swing the final amplifier condenser C-7, back and forth past the point where the fluctuation in grid current occurred. Continue this operation until C-6 is set to a point where rotating C-7 will have no effect on the grid current. We then thoroughly neutralize the final amplifier. In the meantime, make a note of the dial reading of C-7 as to the exact point at which the change in grid current occurred, for this will be near resonance, and the amplifier condenser should be left at this point.

Next open the key and remove the dummy plug from the amplifier plate jack and insert the meter in place of the dummy plug. We then should close the key and immediately be prepared to make the final adjustment of C-7, bringing the plate current of the final amplifier to the lowest possible value.

STANCOR

- 1—Plate transformer, type XP-3699
- 1—Rect. filament transformer, type XP-3062
- 1—Filament transformer, type XP-3063
- 1—Swinging choke, type XC-1645

AEROVOK

- C-1—dual 8 mf. electrolytic condenser, type No. 6615
- C1-1 .01 mf. mica condenser, type No. 1450
- C2-5 .002 mf. mica condenser, type No. 1457
- C3-2 .0005 mf. mica condenser, type No. 1450
- C4-1 .0005 mf. mica condenser, type No. 1450

CARDWELL

- C5-1 150 mmf. MR-150 BS
- C7-1 100 mmf. MT-100 GS

HAMMARLUND

- C6-1 25 mmf. star double-spaced condenser

RESISTORS

- R1-1 50,000 ohms half-watt
- R2-1 10,000 ohms 10 watt Red-devil
- R3-1 10,000 ohms 10 watt Red-devil
- R4-1 20,000 ohms 10 watt Red-devil
- R5-2 ½ meg. ½ watt
- R6-1 2500 ohms 10 watt Red-devil
- RFC-3 2.5 mh. at 125 ma R.F. choke
- L1-1 5-prong plug-in coil form 1½" dia.
- L2-1 5-prong plug-in coil form 2½" dia.

MISCELLANEOUS

- 3-5-prong clip-tite sockets
- 1-4-prong clip-tite socket
- 1-6-prong clip-tite socket
- 1-8-prong clip-tite socket
- 1-4-prong steatite socket
- 1-6-prong male connector
- 3-midget closed circuit jacks, and panel insulating washers
- 1-phone plug
- 2-toggle switches
- 1-jewel pilot light socket and 6.3 volt lamp
- 2-binding posts
- 1-Gordon deluxe oscillator name plate
- 1-Gordon deluxe amplifier name plate
- 1-150 ma 3½" Triplett meter
- 2-2¾" instrument dials, Crowe or Gordon
- 1-80 meter crystal
- 1-83 rectifier tube
- 1-6L6G oscillator tube
- 1-825 Taylor tube
- Screws, nuts, and hardware, AC cord and plug, hook-up wire
- 1-R.F. panel Standard 7" x 19"
- 1-power-supply panel Standard 5¼" x 19"
- 1-R.F. chassis 17" x 7½" x 2½"
- 1-power-supply chassis 17" x 4½" x 1½"

This article has been prepared from data supplied by the courtesy of The Standard Transformer Corporation.

The Super-10•A Receiver for the Man Who Builds His Own

(Continued from page 123)

SWITCHES

SW1—S.P.S.T. toggle switches

I. R. C.

R1—100000 ohms 1 watt Resistor
 R2—350 ohms 1 watt Resistor
 R3—100000 ohms 1 watt Resistor
 R4—100000 ohms 1 watt Resistor
 R5—500 ohms 1 watt Resistor
 R6—75000 ohms 1 watt Resistor
 R7—10000 ohms 1 watt Resistor
 R8—100000 ohms 1 watt Resistor
 R9—350 ohms 1 watt Resistor
 R10—100000 ohms 1 watt Resistor
 R11—100000 ohms 1 watt Resistor
 R12—150000 ohms 1 watt Resistor
 R13—1 megohm 1 watt Resistor
 R14—1 megohm 1 watt Resistor
 R15—50000 ohms 1 watt Resistor
 R16—10000 ohms 1 watt Resistor
 R17—50000 ohms 1 watt Resistor
 R18—50000 ohms 1 watt Resistor
 R19—500 ohms 10 watt Resistor
 R21—400 ohms 1 watt Resistor
 R24—100000 ohms 1 watt Resistor
 R25—50000 ohms 1 watt Resistor
 R26—50000 ohms 1 watt Resistor
 R27—25000 ohms 50 watt Resistor
 R28—50000 ohms 1 watt Resistor
 R30—2500 ohms 1 watt Resistor

ELECTRAD

R20—250000 Tone-Control with switch
 R22—Taper control (0.5 meg.)
 R23—10000 ohms sensitivity control
 R29—20 ohms centre-tapped

MISCELLANEOUS

R.F.C. 8 M.H. chokes
 1—12" speaker, with output transformer
 1—Headphone set. Trimm.
 1—phone jack
 2—4 prong tube socket
 1—4 prong cable connector
 9—8 prong tube sockets for metal tubes
 5—Grid caps for metal tubes
 3 ft. 4-wire cable for speaker connection
 1—A.C. cord and plug
 3—S.P.S.T. toggle switches
 1—chassis 12x17x3
 1—twin binding post terminal

COIL DATA

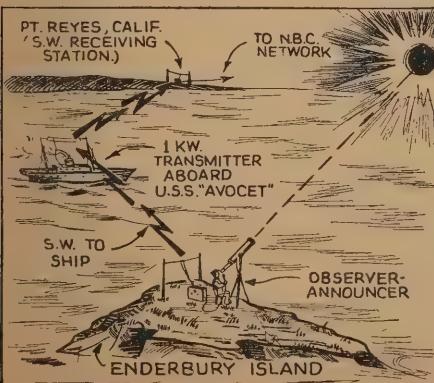
Band	L1	L3	L2, 4 & 5	Tap
1750	9	28	58	No. 28 18
3500	6	19	29	No. 20 9
7000	5	9	10	No. 18 3
14000	5	5	7	No. 18 2

L1, 3 close wound No. 36 D.S.C.
 1750 and 3500 close wound, En.
 7000 and 14,000 spaced to cover, En.
 1½ inch.

Short Waves Report Solar Eclipse

The total eclipse of the sun occurring on June 8, and the events leading up to it have been reported by short waves to American broadcast audiences. The accompanying picture shows the set-up of NBC who sent out a radio expedition especially to cover this important event.

The radio reports of the eclipse where heard over NBC networks from Enderbury Island, and the diagram shows how short waves carried the announcer's descriptions from this uninhabited island in the midst of the Pacific Ocean.



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23 MEASURING INSTRUMENTS IN ONE \$10.40

FEATURES:

The accurate services rendered are:	Instruments
A-C Volts, 15-150-750, at 1,000 ohms per volt	3
A-C Currents, 15-150-750 ma.	3
D-C Volts, 15-150-750, at 1,000 ohms per volt	3
D-C Currents, 15-150-750 Ma.	3
Capacities, .01-50 Mfd.	1
Low Resistance, .03-500 ohms	1
High Resistance, 500-50,000 ohms	1
Inductance, 5-1,000 henries (measurable even with load current through coil)	1
Decibels, minus 12, zero, plus 10	1
Decibels, previous scale plus 20	1
Vacuum-tube voltmeter, 15-150-750 volts	3
Output meter	1
Short Tester	1

23

Thirteen services, equal to 23 instruments, all from same two binding posts. Model AMR (sh'p'g wt. 6 lbs.), for 60 cycle, 90-130 volts a.c. Complete instructions.

Net price \$10.40

IMAGINE precision test instruments averaging 45¼c each in cost to you. Yet that's what the ALLMETER averages, and it is a precision instrument for measuring a-c and d-c volts and currents, resistance, capacity, inductance and decibels. The fan-type meter has d'Arsonval movement (0-1 ma, 1,000 ohms per volt).

OSCIMETER Lowest-priced direct frequency-reading all-wave signal generator, this instrument, accurate to 1% on i-f and broadcast bands, 2% on short waves, covers 100 kc. to 22 mc., all on fundamentals, in five bands. It is switch-controlled, has attenuator, and enables also leakage test of condensers, tubes, etc. It has sine-wave r.f., also separate modulator, cut in or out by switching. Its purpose is to align all types of receivers.

This instrument works on 90-130 volts, a.c. or d.c. If a.c. is used it may be of any commercial frequency. Tubes are oscillator, rectifier and modulator. R-F output may be at high or low impedance, from separate posts. Also separate audio output enables testing P.A. systems and other a-f amplifiers. Housed in black wrinkled finished shield cabinet, with carrying handle, the signal generator, 5 lbs. unpacked, is easily portable. Order Oscimeter Model T-40, complete with three tubes and instructions. (Shipping weight 6 lbs.)

\$10.40



An especially attractive front panel distinguishes the appearance of the Oscimeter. A transparent mask and inscription protector produces a brilliant effect due to both transmitted and reflected light, easy on the eyes.

TUBE TESTER We absolutely believe this instrument to be the best buy for either novice or expert serviceman. It is not only as thorough and accurate, but actually a faster tube tester than similar but more elaborate and expensive instruments. Tests tubes on the "emission" principle, and permits testing for shorts or leakage between elements so that positive accuracy in checking is obtained. Checks all types of tubes, whether UX or octal base, and allows for separate checking of diode sections of composite tubes. Real rugged construction, and priced so low that no serviceman or constructor can afford to be without it. The following salient features are incorporated in this instrument:

- Tests all 4, 5, 6, 7s-7L and octal base tubes.
- Tests all diode, triode, pentode and tetrode receiving tubes, as well as many transmitting types.
- Tests diode, triode and pentode sections of composite tubes separately.
- English reading meter, with "Bad—?—Good" scale.
- Incorporates Neon Test for determining leakage or shorts between elements.
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Model V-45 Tube Tester. The panel is designed for symmetry and high accessibility, with utter convenience of operation. Carrying handle (not shown) included.

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SPRINGWATER, N.Y.

TR-6A6 TRANSMITTER —RECEIVER FOR 5-METER BAND DUPLEX OPERATION

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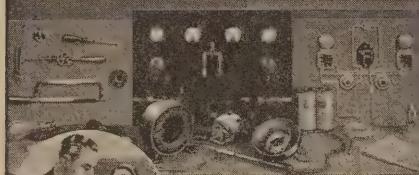
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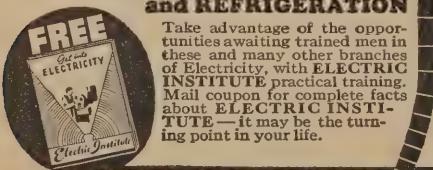
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Around the World Radio Echoes

(Continued from page 117)

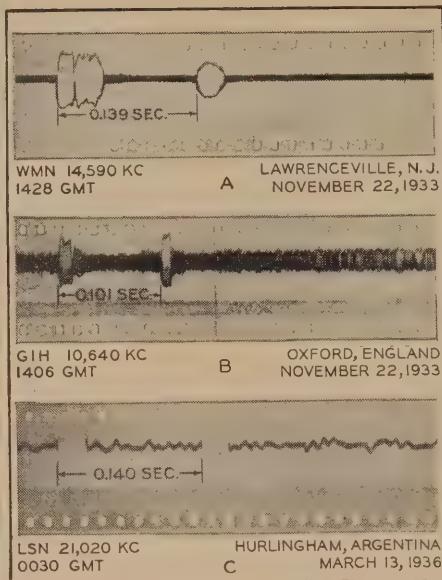


Fig. 6—Around-the-world echoes as they were recorded at Netcong, New Jersey.



Fig. 4—Lighting conditions for the position of the earth at 7:30 a.m. Greenwich Mean Time on December 21.

and rear around-the-world echoes, is received from a direction 180 degrees from the direct signal.

Short-wave transmission over long distances depends largely on the reflection of the waves back and forth between the earth and the ionized layer high overhead. The reflecting behavior of the ionized layer is a function of both the frequency of the waves and the exposure of the layer to light from the sun. When the ionized layer is in darkness, frequencies above about 10,000 kilocycles are not reflected for the most part, and thus long-distance

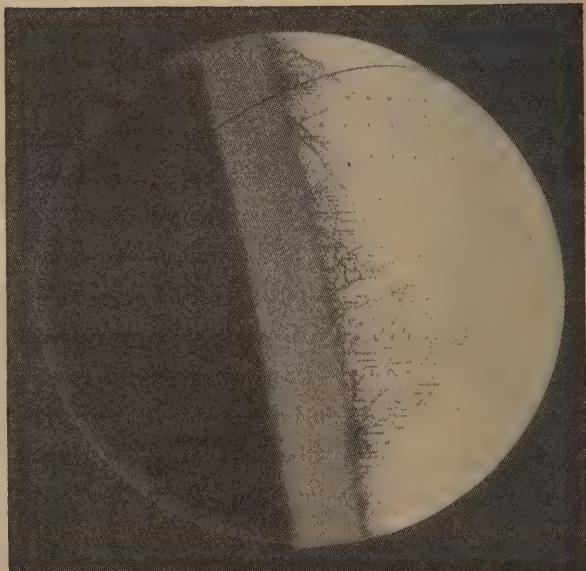


Fig. 7—Early morning in April or September.

transmission at these higher frequencies becomes poor. When the layer is illuminated, however, these frequencies are reflected, and long-distance transmission becomes possible. As a result of these facts it is common practice in radio transmission to use the higher frequencies for daylight conditions over the transmission path, and the lower frequencies for nighttime conditions. For the transition period between dark and daylight, frequencies in the neighborhood of ten thousand kilocycles are employed.

Since the altitude of the refracting layer is from 100 to 250 kilometers (60 to 150 miles), an around-the-world signal path is never entirely in darkness, so that frequencies much below 10,000 kilocycles seldom experience around-the-world *echoes*. On the other hand, there are times of the year when certain paths may be completely in daylight. Under these comparatively uniform and favorable conditions of illumination, there is every likelihood that around-the-world *echoes* will be prevalent at higher frequencies.

Illumination of the ionosphere beyond the shadow line at the earth's surface is illustrated by Figure 2, which represents conditions when the earth's axis is at right-angles to the sun's rays. This occurs around March 21 and September 21. During winter in the northern hemisphere, the north pole is tilted about 23 degrees away from, and in summer the same amount toward, the sun. The tilt is such that only great circle paths passing within some 4000 kilometers of the poles are ever totally illuminated at ionized layer heights of 150 kilometers (90 miles). It is not to be expected, therefore, that echoes will occur frequently on around-the-world paths that are more than this distance from the poles. The time of day and season of the year when they are most apt to appear on favorable paths may be readily determined by computation.

At an altitude of 150 kilometers the great circle path between New York and Lon-

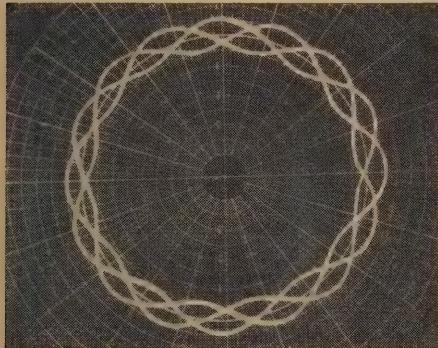
5-Meter Waves Visible

(Continued from page 120)

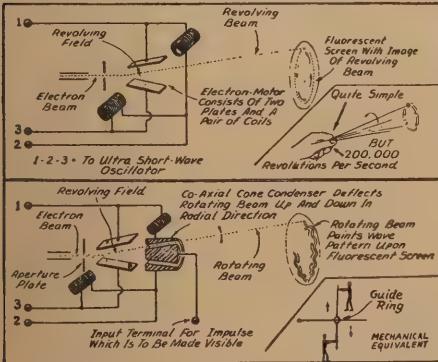
Let us assume that the beam rotates with the maximum speed of 200,000 revolutions per second, quite an enormous speed. And let us assume that the voltage feed into the co-axial-cone-condenser is of an extremely high frequency, but we do not know the frequency. By looking at the screen we observe that each of the many small curves "painted" upon the screen covers a length of exactly the width of one of the 100 segments of the polar-coordinate system. What is the frequency? Quite simple: We divide the number of beam revolutions by the number of polar segments; i.e., 200,000 revolutions by 100 (number of segments) which gives us the "length of time" for each of the small curves painted upon the screen to 1/20,000-000 second.

Curves with a frequency as high as this could not be observed with an ordinary cathode ray oscillograph, but are now possible, because the tremendously high speed of 200,000 revolutions per second pulls the single curves far enough apart so as to make them distinct and measurable.

If only a third of a segment of the polar diagram is covered by a single curve, the time indicated is exactly 1/60,000,000 second; a value which corresponds with a frequency of 60 mc., and equals a wavelength of 5 meters.



This photo shows front view of the new Von Ardenne Oscillograph while reproducing a frequency pattern of complex nature.



Top—Everyone knows how to whirl a piece of rope. This simple principle is applied to whirl an electron beam, but with the unusual speed of 200,000 revolutions, per second.

Lower diagram—We see the same "electron-motor" but with a funnel (with inside cone), called by the inventor a "co-axial-condenser" installed in front.

160 Meter Coil Data for "MT" Xtal Transmitter

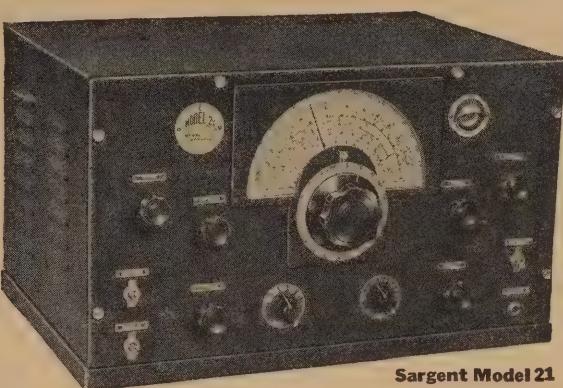
The author has received many requests for 160 meter coil data for the "MT" transmitter, published in the September 1936 issue.

The coils should be made as follows:
Osc. Tap Wire Amp. Wire Space Ant.
41 turns $\frac{1}{3}$ No. 22 44t. No. 18 1 dia. 15 turns
way up D.C.C. D.C.C. on cold
end.

All coil forms $2\frac{1}{4}$ inches in diameter.

—H. D. Hooton, W8KPX.

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Sargent Model 21

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- Iron Core I.F.'s
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- Manual Volume or Amplified AVC
- Heavy, welded steel cabinet
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- Made in 2 Tuning Ranges: Amateur Model 9.5—550 Meters
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6 VOLT BATTERY MODEL

Furnished for either tuning range at \$3.00 higher than the A.C. price. Excellent for portable or direction finding work.

New Net Prices, 110 v. 60 cy. Operation

(Effective May 15th)

Model 21-AA, 9.5-550 meters.....	\$139.00
Model 21-MA, 9.5-3750 meters.....	155.00

These prices include R.C.A. tubes, power supply, Jensen Speaker and speaker cabinet.

BUILT FOR EXTREME DX

Model 21 has been primarily designed for extreme DX reception. Although built to communication standards throughout, it has still been possible to include a sensitivity level far greater than that usually found in super-hets.

AVAILABLE IN 2 TUNING RANGES

Model 21 is available in Amateur Tuning Range, 9.5 to 550 meters, or in Commercial Tuning Range, 9.5 to 3750 meters. Both ranges are continuous, no skips, no dead spots. Receivers for the 2 are absolutely identical, the only difference being in the number of coils furnished.

These Model 21 prices became effective May 15th:

Model 21 Net Prices for 110 V. 60 cycles operation

Model 21-UA, UNIVERSAL tuning range, 9.5 to 20,000 meters.....\$77.00

Model 21-MA, MARINE tuning range, 9.5 to 3,750 meters.....\$5.00

Model 21-MA, MARINE tuning range, 9.5 to 550 meters.....\$2.00

Prices include power supply, speaker and R.C.A. tubes.

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D-5 50 Ohms

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2 BUFFER DOUBLERS

- Triode
- Dual Triode

4 AMPLIFIERS

- Single Triode (T20 or Type 10)
- Push-Pull

Triode (T20 or Type 10)

- Single Pentode (RK-39 etc.)

● Push-Pull Pentode (Bi-Push)

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48 CIRCUIT COMBINATIONS

FOR \$49.95

Here's a natural for the medium-power amateur. 4 Oscillators . . . 2 Buffer-Doublers . . . and 4 Amplifiers . . . 55 to 120 watts input . . . ALL FROM A SINGLE KIT. The kit includes circuits on the most recently released tubes . . . and circuits on older types of tubes that you probably have in your shack.

The new Stancor "48-C" Kit contains all the parts you need FOR EVERY CIRCUIT — less crystal, tubes and meter.

COMPLETE SCHEMATIC BLUE PRINTS FREE WITH EVERY KIT

WORLD S-W Station List

(Continued from page 137)

4.790	VESBK	VANCOUVER, B. C., CAN., 62.63 m., Addr. Radio Sales Service, Ltd., 780 Beatty St. Except Sun. 11.30-11.45 am., 3-3.15, 8-8.15 pm.
4.752	WOO	OCEAN GATE, N. J., 63.1 m., Addr. A. T. & T. Co. Works ships irregularly.
4.600	HC2ET	GUAYAQUIL, ECUADOR, 65.22 m., Addr. Apartado 249. Wed. and Sat. 9.15-11 pm.
4.272	WOO	OCEAN GATE, N. J., 70.22 m., Addr. A. T. & T. Co. Works ships irregularly.
4.250	RV15	KHABAROVSK SIBERIA, U. S. S. R., 70.42 m. 1-10 am.
4.107	HCJB	QUITO, ECUADOR, 73 m. Daily 7.30-8.45 am. Daily except Mon. 11.30 am.-2.30 pm., 5-7 pm., 7-10 pm.
4.098	WND	HIALEAH, FLORIDA, 73.21 m., Addr. A. T. & T. Co. Works Bahamas irregular.

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What an A. T. & T. Co. Engineer Has to Say

(Continued from page 116)

with long waves as far back as 1914, and with short waves since 1927."

"Were the results very encouraging back in 1914?" I asked.

"Oh yes," said Dr. Perrine. "In 1915 our engineers succeeded in being heard out of Arlington, Virginia, as far away as Paris, France, and not long afterward in Honolulu."

"Has the experimental work been conducted continuously since that time?" I asked.

"In reality, yes," replied Dr. Perrine. The radio telephone equipment which we developed for the Army and Navy laid the foundation for later advances. One of the most serious limitations for long-distance radio telephony in the early days was the lack of vacuum tubes of suitable power carrying capacity. As you probably know," continued Dr. Perrine, "The experimental work out of Arlington entailed something like five-hundred 20-watt vacuum tubes."

"How did you overcome this limitation, Dr. Perrine?" I asked.

"Well," he replied, "when our Laboratories perfected the method of hermetically sealing copper and glass together, we were able to build water-cooled vacuum tubes of fairly large power-carrying capacity. These made very good amplifiers for stepping up the energy level. From that time on the venture gave promise of commercial possibility."

"Dr. Perrine," I asked, "tell us about the opening of commercial service. It was in 1927, I believe?"

"Yes," he replied, "that was on January 7, 1927, on a wave-length of 5,000 meters. You probably know that this channel uses what is known as the single side-band, suppressed carrier system.

How Optimum "Long" Wave was Selected

"Yes, I recalled that," I answered. "I have described to our readers the circuit layout and the voice-operated device that made possible the two-direction operation on the same wave-length. But tell me, Dr. Perrine," I continued, "how did you come to select the wave-length of 5,000 meters?"

"That is a very interesting question," said Dr. Perrine; and he continued, "A large number of experiments were conducted on wave-lengths above and below 5,000 meters, and the results of signal-to-noise surveys indicated that the 5,000-meter region was the most satisfactory of the long-wave spectrum."

"This single side-band suppressed carrier system—was that something new at the time?" I asked.

"No," replied Dr. Perrine, "this was a developed application of the multi-channel carrier system, utilized over open-wire lines, wherein four telephone messages are transmitted simultaneously over the same two wires, without the slightest interaction. This system uses electric wave filters, which were developed by Dr. G. A. Campbell and his associates, and amplifiers, modulators and demodulators developed by other engineers at our laboratories. Under William Wilson, Lloyd Espenschied, Ralph Bown, R. A. Heising, A. A. Oswald, and a host of others here and in England, a very fine transmitter and receiving system was built up. This is an example of the high degree of coordination required among different development groups."

Effect of Sun Spots on Transmission

"That is very interesting," I said. "But going more into the radio transmission side, I should like to ask you what effects does the solar activity have on your long and short-wave circuits?"

"Well," answered Dr. Perrine, "during the sunspot maximum when solar activity is also the greatest, the performance of the short wave channels, especially over long distances, is decidedly poorer compared to the sunspot minimum condition. This is especially the case over transmis-

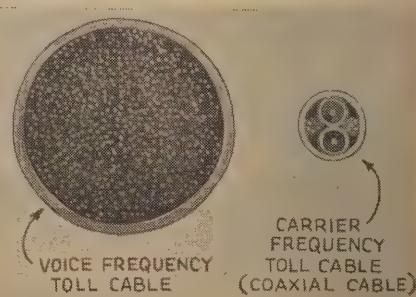
sion paths which traverse areas where the aurora are very frequently seen, such as our circuits to Europe, the great circle path of which extends fairly far north. Generally speaking, short-wave transmission is degraded during the sunspot maximum period. You probably recall that the effect of solar activity is usually manifested in other terrestrial phenomena, such as erratic motions of the compass needle, which are called magnetic storms; beautiful auroral displays, and the oscillations of large electric currents in the earth's crust, simply referred to as earth currents. During severe magnetic storms, as these effects are generally called, some short-wave channels are at times degraded beyond commercial usage. In moderate and mild magnetic storms the longer of the short waves are used very successfully. There is little change in the long-wave performance during the minimum-maximum periods of solar activity. In general, the long waves are slightly improved during the sunspot maximum period, as compared with the minimum period—the opposite of the effect on the short waves."

"What happens when your circuits go out during disturbed periods, Dr. Perrine?" I asked.

"When the European short-wave circuits, because of severe disturbances, are degraded beyond usage," he replied, "the traffic is moved over the long waves. The long waves are vulnerable to static, to which the short waves are much less susceptible. Hence the two types of facilities supplement each other in their characteristics. Incidentally the circuits to South America, Bermuda, Central America, and the Orient are very seldom degraded beyond commercial usage during magnetic storms."

How "Best" Wavelength is Determined

"Tell me, Dr. Perrine," I asked, "how do you determine what wavelength to use for the short-wave operation?"



Comparison between an ordinary "voice-frequency" toll cable at the left, and one of the new "coaxial" toll cables.

"Oh, that is more or less determined by the results of past performance," he replied, "and this may be modified by practical tests on any particular wave-length or frequency. As you know, the frequencies used for transmission across the oceans, or for ship-shore, change with the seasons. Many years of observation and measurement have indicated roughly what the optimum frequency is for the different times of day, and for the different seasons. Our operating people know more or less what to expect and prepare themselves accordingly."

"What determines whether a circuit is commercially usable, Dr. Perrine?" I asked.

"Well," he replied, "that is the condition in which the subscriber would get complete transmission satisfaction and would be able to get his message through without difficulty. If noise or fading introduces distortion to such an extent that little transmission satisfaction obtains, and repetitions are becoming frequent, it is considered

unusable for commercial operation. Whenever a short-wave circuit is on the verge of becoming uncommercial the next optimum frequency is explored and a wave-length change is generally made to insure satisfactory transmission."

"In connection with your *ship-shore* circuit, Dr. Perrine," I asked, "how do you determine what wave-length to use for the various distances of ship position?"

"Based on the results of years of observations on short-wave facilities," explained Dr. Perrine, "our engineers have prepared special charts showing the best wave-length to use for contacting any ship for any distance, for any particular time of day. By consulting these charts the optimum wave-length is very quickly determined for any distance or time."

"Foreign" S-W Broadcast Pick-ups

"That is very interesting," I said, "but how about these *foreign* broadcasts that come over your facilities, will you tell us something about them, Dr. Perrine?"

"I shall be glad to," he replied. "Program transmissions over our (short-wave) channels have been an important part of the service for the past several years. These in turn are fed to the American broadcasting networks for retransmission. The average run of these *foreign* programs that are routed over our overseas circuits is handled on what is known as a "regular" basis; in this only one distant radio transmitter is used, and this is set on the optimum frequency. For a special transmission two or more distant transmitters may be used, and unless radio conditions at the time are doubtful these different transmitters are set on the optimum wavelength. If, however, the *short-wave* transmission conditions are doubtful one of the distant transmitters is set on the optimum frequency and the others are set above or below the optimum frequency, as radio observations may best indicate. For example, if 24 meters is the optimum wave-length for the given time of day and conditions are somewhat doubtful, the observation station in exploring 16 and 33 meter wavelengths finds 33 meters quiet and the fields getting stronger, while observations on 16 meters show weaker fields than normal, then the use of the 33-meter wave-length is advised as the next alternative, and accordingly one transmitter would be set on 24 meters and the other on 33 meters."

"That is a new angle," I said. "Your receiving arrangement is also very interestingly set up."

"Yes," replied Dr. Perrine, and he continued, "Usually for these programs two or more *short-wave* receivers will be used for either regular or special programs. One may be a single receiver, and the other may be associated with a *diversity* arrangement of antennae. A regular and emergency set-up is always used. The technical operators at the terminal are continually monitoring on the different receivers and switch the network to the receiver giving the best reception."

"This *diversity* arrangement," I asked, "is it similar to that used by the RCA?"

"Yes, it is," he answered. "We use this system in connection with rhombic antennae, developed by Edmond Bruce of our laboratories, and it makes a very effective set-up. The diversity system helps to mitigate the effects of fading, which at times can be quite bad. The rhombic antennae have very good *directional* properties, which help keep the *noise-level* down. And by the way, before leaving this point, may I say that the radio companies as well as ourselves furnish facilities for the transmission of programs; hence there are many rebroadcasts that do not involve our overseas circuits."

Some Light on "Coaxial" Cables

"I should like to ask you a few questions about the new *coaxial* cable, Dr. Perrine."

"Surely, go right ahead," he answered.

"Reports I have seen," I continued, "indicate that a large number of simultaneous messages or conversations can be carried over a single coaxial conductor arrange-

ment. Will it be possible to carry a television program, using the frequency range occupied by these numerous channels?"

"Yes," replied Dr. Perrine, "that seems like a possibility, and it illustrates very nicely the versatility of the electromagnetic spectrum. For each telephone conversation a band of 4000 cycles is used, ranging from 60,000 cycles as a minimum carrier frequency; and since there are 240 channels of approximately 4000 cycles each, the upper end is 60,000 plus 240 times 4000, or 1,020,000 cycles. Of course, this million-cycle band may be utilized "en bloc" for a single television channel."

"One million, twenty thousand cycles!" I exclaimed, and went on, "Why that's about a 293-meter wave-length, using the speed of light as the velocity. That seems low in frequency compared to the short-wave radio channels."

"Yes, it is," said Dr. Perrine, "but we have been using coaxial cable transmission lines at our radio receiving stations now for years. That is, they bring the energy collected by the various antennae systems to the radio receiver. Some of these coaxial transmission lines are over two thousand feet long, and they are used on frequencies as high as 21 megacycles."

"What would you say would be the upper frequency limit, Dr. Perrine?" I asked.

1500 mc Over a "Coaxial"!

"Well," he answered, "from the laboratory reports and especially the results in the extremely high-frequency region, conducted by Dr. G. C. Southworth, it would be a rather rash conjecture to venture any guess about the upper limit. It is not uncommon to transmit frequencies as high as 1500 megacycles! It may interest you to know that, from Dr. Southworth's investigations, it is possible to remove the central conductor entirely from the cable, and the wave transmission at these very high frequencies still continues! Moreover, even the copper tube which comprises the outer conductor of the coaxial system could be removed, and the flow of energy would still continue so long as there is some sort of wave guide retained to direct the wave. In fact, a rod of insulating material would probably serve."

"My, how fascinating!" I exclaimed and proceeded. "But getting back to the New York-to-Philadelphia coaxial cable. There was a demonstration on November 30th and December 1st of last year, as I recall. What was the arrangement at that time?"

"At that time," replied Dr. Perrine, "thirty-six out of the possible 240 channels were provided with terminal equipment. These channels were looped back and forth about twenty times, giving a transmission path 3,800 miles long in the coaxial system. In order to get a circuit of this length, it was necessary to modulate from one carrier frequency to another some seventy times. Moreover, on each of the twenty round-trips, the voice went through the repeaters, or amplifier units, a total of 400 times. This circuit, as you probably remember, was demonstrated to members of the Federal Communication Commission on November 30th and to members of the press on the following day."

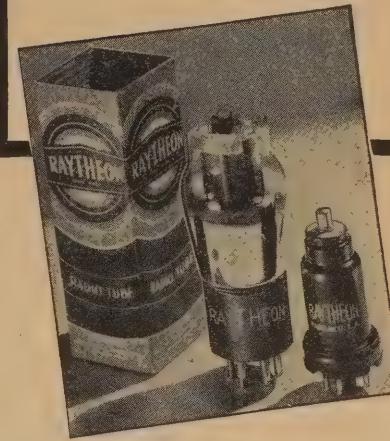
"That was quite a remarkable set-up!" I exclaimed. "What were the energy losses of this cable, Dr. Perrine?"

"If we may call the loss for the mid frequency of the broad band the *average* loss, this is about 4.5 DB (decibels) per mile," he replied, and went on, "The total average loss is in the order of 17,000 DB. As you know, every 3 DB reduces the power one-half. That is, 6 DB reduces it one-quarter, 10 DB one-tenth, 20 DB one one-hundredth, 60 DB one-millionth, etc. If it were not for the repeaters, or amplifier units, the ratio of the energy at the beginning of the circuit to that at the end of this 3,800-mile path would be 10 with 1,700 ciphers after it, that is, a million multiplied by itself more than 283 times."

"Good heavens!" I exclaimed. "That is one of the biggest numbers I ever heard of!"

"It is a very large number," he replied. "In fact, it is larger than the ratio of the size of the universe to that of the electron."

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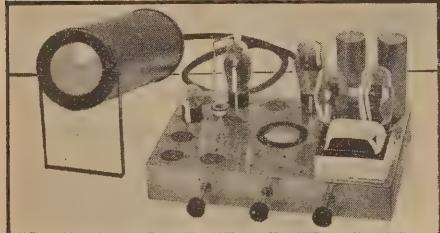
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RADIO INSTRUCTION

NEW "OFFSET" CRYSTAL "PICK-UP"

The engineers of the Astatic Microphone Laboratory, have just released their new *Trutan Model B-16 Pickup*. The offset head maintains the projected vibration axis of the pickup, tangent to the record groove throughout the entire playing surface, to a degree not otherwise attainable. The result is a marked reduction in tracking error over conventional designs, giving more lifelike reproduction and longer record service.

Further developments of the well-known Astatic crystal pickup cartridge have produced for the B-16 a frequency-response curve exactly suited to present-day recording practice. Arm resonance has been completely eliminated.



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This article has been prepared from data supplied by courtesy of Astatic Microphone Lab., Inc.

Set-Making Easy With New Switch-Coil

(Continued from page 147)

.000025 mf. and a .0005 mf. by-pass condenser to ground is connected to one of the heater terminals on the 6J7 oscillator tube. In all other respects the circuit diagram applies to both types of tuning units.

The coils and band-switch are so connected that the low-frequency bands are at the left-hand or counter-clockwise position of the band-switch. The tuning ranges and alignment points for each band are indicated in the table of Fig. 2. The location of the various trimmers and padders for each band is shown in Fig. 2. Although the trimmers and padders may be in a slightly different position than indicated in the drawing depending on the type of tuning condenser required, and the ranges covered, it is possible to identify these units at a glance.

The tuning units are aligned and properly padded at the factory in a receiver. Thus, good reception should be obtained immediately when the set is placed into operation. If the adjustments have been changed for some reason then the set can be re-aligned by following the directions covered in the following paragraphs.

Two capacities of tuning condensers are used, 410 mmf. for the standard ("fan") assembly and 260 mmf. for the "Communications" ("ham") job. The tuning ranges for both capacities are given in the following table.

260 mmf. Condenser

Band	Range
1	550-1560 KC
2	1560-4400 KC
3	4.8 -12.0 MC
4	11.38-32.0 MC
5	32.0 -60.0 MC

410 mmf. Condenser

Band	Range
1	140-400 KC
2	530-1800 KC
3	1750-6200 KC
4	5.9-18.0 MC
5	14.0-48 MC

This article has been prepared from data supplied by courtesy of Meissner Mfg. Co.

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RADIO INSTRUCTION

Let's "Listen In" with Joe Miller

(Continued from page 128)

in one Saturday at 3:30 p.m. with a fair signal, though marked by bad CW QRM. This station can be logged without much difficulty if one has a well-calibrated dial. Nevertheless, this station—operated by the Radio Club Tenerife—is considered a difficult station to log, chiefly due to the almost impossible CW QRM situation prevailing on that frequency, requiring a very selective receiver to enable good reception to be had.

EA8AB maintains a schedule of 3:15 to 4:15 p.m., operating on Monday, Wednesday, Friday and Saturday, and sends a very attractive QSL card, as shown in our first article. This station will again be heard fine when Fall rolls around.

EAJ43, 10.37 mc., also Tenerife, is becoming a *standby* signal, and can be depended upon any evening it is tuned for. The best signal is between 6 and 9 p.m. although they seem to operate later upon occasion, so that a definite schedule can not be depended upon. EAJ43 sends an attractive card with some photo of native scenes from the Canary Islands. Both EAJ43 and EA8AB are classed as Africans and both may be reached by addressing reports to the Radio Club Tenerife, P. O. Box 225, Tenerife, Canary Islands.

French Indo-China

Radio Saigon, which was heard early in the month on approximately 11.70 mc., maintains a schedule of from about 5 to 9:30 a.m. daily and Ashley Walcott now reports it on exactly 11.705 mc. The station announces as "Ici Station Boy-Boy, Rue Catinat, Saigon." This is undoubtedly last summer's "Philco Radio." This is another Asiatic to be looked for next Fall and Winter, having now faded out.

FZS, 18.388 mc., Saigon, is reported phoning irregularly from 5:20 to 6 a.m. by Ashley Walcott. This station has a peculiar carrier which may help to identify it, the signal having a very rapid "flutter."

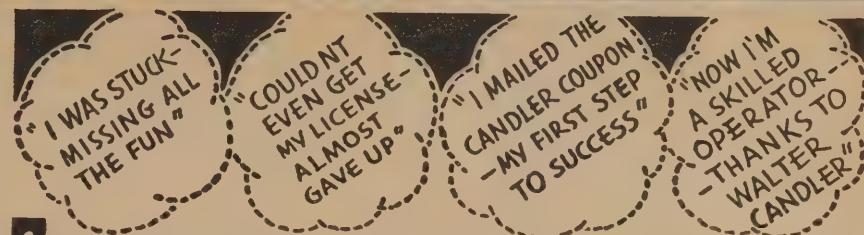
FZR, 16.25 mc., also Saigon, has been reported at the very early hour of 5:30 a.m. phoning FTK, 15.88 mc., both poor signals. FZR usually maintains schedule with FTK near 8:30 a.m. but is often heard earlier. This is a good bet as FZR generally has a very strong signal for such a distant station.

Miscellaneous

Some late specials here are ZTJ, 6.0975 mc., Johannesburg, still being heard between 12 and 12:45 a.m. but with a poor signal, high noise level making it impossible to get a good log.

KZGG, 6.98 mc., Cebu, Philippine Islands has been logged at 4:10 a.m. thanks to Ashley Walcott's tip. Ashley has received a veri stating KZGG has 400 watts and uses frequencies of 7.83, 6.98, 5.21, and 4.345 mc., but that 6.98 mc. is the usual frequency for service with Manila, to which their antenna is directed. Working schedules are 6:30 to 11:15 p.m. and 1 to 4:15 a.m. KZGG occasionally works on 7.83 mc. and is heard daily except Sunday at about 4:10 a.m. by Mr. Walcott. QRA: Mr. A. D. Sison, Radiophone Station Supervisor, Philippine Long Distance Telephone Company, Cebu, Philippine Islands. Tnx for this FB tip, OM.

CR6AA, 9.666 mc., at Lobito, Angola, Portuguese West Africa, has verified our report of February 13 when they were heard with signal ranging up to an R6 to 7. This is the third veri we have received from this ace catch and we now have both frequencies verified, including 7.177 mc.



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HAM STARDUST Africans

FT4AG logged at 4:45 p.m. on 14380 with a very good R8 to 9 signal. This one at Tunis. SU1SG, Egypt, also logged with a FB signal. SU5NK, 14310, logged at 5:40 p.m., announcing "SU5 Norway Kilowatt."

CN8MB, 14122, logged at 4:25 p.m. announcing as "CN8 Mexico Boston." ZS6AJ, 14020, logged at 11:40 p.m.

Africans still coming through very well on the West Coast with the following being logged by Ashley Walcott. ZS2N, 14030; ZS2X, 14050 and 14365; ZS6AJ, 14020; and ZU6P, 14075. Also ZEIJF, 14070; ZE1JR, 14044; and 14255. That is all on the Africans here, the Asiatic hams taking the spotlight this month.

EA8AF, 14127, Canary Islands, logged at 11:10 p.m.

Asiatics

PK1MX, 14090, Java, announcing as "Mexico, Xray" was logged at 7:35 a.m. giving a good clear signal. Many other Asiatics are reported, mainly by listeners out westward. Ashley Walcott out on the West Coast hears 'em as we hear the Europeans here, and reports a mess of them, as follows: KA1AN, 14070; KA1AP, 14218; KA1DL, 14040; KA1ER, 14050 and 14320; KA1KY, 14240; KA1MD, 14180; KA1RB, 14140; KA1YL, 14170; XU8HW, 14060; XU8MT, 14010. XU8HW has been reported by quite a number of DXers, including Irv Goodeve, Carlos Irizarry, Pedro Rodriguez and John DeMyer. XU8HW also reported on 14310.

Also reported are VS2AK, 14080; VS2AO, 14180; PK1BX, PK1VY, PK1GL, all on 14260 and PK2VD on 14265. Also PK1VH, 14330; PK1VM, 14090; PK1ZZ, 14280; PK3GD, 14030; PK3LC, 14010; PK3ST, 14310; PK3WI, 14040; PK4DG, 14380; PK6AJ, 14100; PK6CI, 14080; XU3GG, 14200.

In Ceylon, John DeMyer reports VS7RA. Irv Goodeve reports VS7AK, on approximately 14000 at 1:20 a.m. Also reported by Carlos Irizarry are PK3TW, PK4JD, PK6CJ, VS6AS, KA1MG; frequencies not stated on these.

Others reported lately are OH3NP, YM4AA, and ZL2LC heard near 14090 at 7:20 a.m., and ZL2LO at 7:32 a.m., frequencies of last not given.

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2AT-8	4	34-	4	47-	5	80-	4	6A8-2
2Z3	2	32-	3	49-	5	81-	2	6A8-2
6A7	3	33-	3	49-	3	82-	4	6F5-2
6B7	3	34-	3	50-	3	83-	3	6F6-2
6C6	3	35-	4	53-	3	83V-	3	6H6-2
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In the Azores CT2AB, 14346 was heard at 4:35 p.m. SM7YA, logged on 14050 at 10:45 p.m. announcing as SM7 Yokohama, America. Also VP1AA heard twice on 14125 at 11:50 p.m. and 12:40 a.m.; also by Dick Hofsaes at 1 a.m. VP1AA is listed in the call-book as in British Honduras, but the signal heard was undoubtedly from a great distance and we believe it to be located in Zanzibar, as, after hearing VP1AA, we heard a Canadian amateur call excitedly, "Hello, VP1AA, Zanzibar," repeatedly. We have a report that a well known eastern DXer has received a QSL from VP1AA, from Zanzibar, SM5-SV, 14000, also logged at 6:15 p.m. with a "FB" signal.

In Australia, outstanding catches are VK7YL, 14065 at 4 a.m., VK7JB, 14090, and VK6FL, 14330 at 4:50 a.m.

Late specials from Roy Myers are J2MI, 14290, Japan, heard daily 3 to 4 a.m. Roy says this amateur announces in a high-pitched voice, poor modulation, as J-Japan, No. 2, M-Mexico, I-India. Also J2KJ, from 2 to 4 a.m., same frequency as VK2AB, with good modulation.

All these Asiatics mentioned, with one or two exceptions, have been logged between 5:30 and 8 a.m. here and on the West Coast from 6 to 10:30 a.m. On the West Coast, Africa is usually heard, 9 to 11 a.m. and around midnight. Africans are generally heard between 4 and 6 p.m.; Australians between 5:30 and 7 a.m.

Murray Buitenkant, 3020 Coney Island Ave., Brooklyn, N.Y., would like to exchange QSL cards with any DXers.

VAC Listing

Beginning this month and hereafter, we will endeavor to list all DXers records of total verifications from each continent (VAC) and total countries verified, all of this, of course, on phone. Here is a partial listing of DXers who have 5 VAC or better. Any DXer with 5 verifications or more from each continent may have his DX record published here every month so we urge all eligibles to send us their rating on a post-card by the 20th of each month direct to our address. The ratings follow:

John DeMyer	36	VAC	96	countries
Eddie Schmeichel	33	VAC	85	countries
Charlie Miller	23	VAC		
Pierre Portman	21	VC	76	countries
Roy Myers	17	VAC		
Russ Ballard	12	VAC	61	countries
Irving Goodeve	10	VAC		
Ralph Gozen	6	VAC	62	countries
Ashley Walcott	5	VAC		
Ed Goss	5	VAC	59	countries
Pedro Rodriguez	5	VAC	58	countries

FLASH!

Station SUISG, Alexandria, Egypt, on 14,000 kc. will send a special broadcast on June 25th, at 7 p.m. E.S.T. The broadcast will be for a half-hour and will open with the chimes of a clock recording 2 a.m. Egyptian time. All reports will be verified with a handsome QSL card. It should be accompanied by a reply coupon.

This has been arranged by Joe Miller, our DX Editor, and is for the benefit of SHORT WAVE & TELEVISION MAGAZINE and the I. D. A.

We urge all listeners to try for this station. It comes in with very good signal strength! The address is: Frank H. Pepit, Catholic Club Mustapha Barracks, Alexandria, Egypt.

Short Waves and Long Raves

(Continued from page 134)

"Ham & Fan Band-Spread 2" Hot Stuff!

Editor, SHORT WAVE & TELEVISION:
I built your receiver called the "Ham and Fan Band-Spread-2" described in the Dec. issue of Short Wave Craft and wish to report some of the results I have had with it.

On the 75-meter phone band I have received every district in the United States and a few in Canada and South America. On the 49-meter broadcast I have received these stations: COCO Havana, Cuba; W8XK Pittsburgh, Pa.; W8XAL Cincinnati, O.; W9XF Chicago, Ill.; CRCX Toronto, Can.; W3XAU Newtown Square, Pa.; W3XAL Bound Brook, N.J.; COCD Havana, Cuba. Bob Westphal, 6422 LaMiroda, Ave. Los Angeles, Calif.

SHORT-WAVE REPUTATION!

SHORT WAVE & TELEVISION 99-101 Hudson Street, New York, N.Y.; SWIT-7-37	Gentlemen: I enclose herewith my remittance for the amount of \$_____. Postpaid, the books checked by you are to stand me, postpaid, for which I am responsible.
<input type="checkbox"/> How to Get Best Short-Wave Reception	
<input type="checkbox"/> 101 Short-Wave Hook-ups.	
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Real "DX" on Low Power?

(Continued from page 125)

110 volt lead to the transmitter was brought near the receiver there was quite a bad modulation of signals. To cure this the transmitter on and off switch for the filaments was placed on the rear of the shelf in the back, necessitating a separate 110 volt lead for the 2.5 volt filament transformer.

Antenna Should Be Tuned!

The antenna tuning unit is connected to the receiver by a twisted-pair link of low loss hookup wire and to the transmitter by a link of two No. 16 wires spaced about $\frac{1}{4}$ inch apart, spaced with small drilled hard-rubber blocks. The wire used for the receiver "link" should be of small diameter to keep down capacity loss.

Series tuning is always used here in tuning the antenna, and the antenna tuning condensers are mounted with hard-rubber to a wooden piece screwed to the back of the table. The antenna coil is held by two glass towel-bars. The link coil to the switch is slipped into the antenna coil, and when the correct setting has been found, cemented to the coil. Cementing the links to the coils is necessary to save time in changing bands, which operation would otherwise be quite arduous; as it is only five units have to be changed. To get the correct setting of the links, the antenna should be tuned to the receiver and the coupling adjusted at either the receiver or the antenna coil link—or both—to give the best volume with good selectivity.

The antennas used in this case are three in number. They are of No. 16 enameled copper wire. For 20 meters, two 99 feet laid out according to a great-circle chart are used; for ten meters a vertical, consisting of two half waves stacked to give better low-angle radiation. A half-wave stub is used and the antenna fed at the lower end. A single 16 foot vertical could be used for ten, and two 33 foot antennas for twenty. This latter arrangement is not nearly so good as the first. The series tuning condensers of the antenna tuning unit are equipped with jacks and the twenty meter feeder section and the ten-meter feeder plugged in, depending on the band being used. The ten-meter feed is the conventional Zepp arrangement, but for twenty a combination Zepp and end-feed aerial is used. Instead of bringing the two antennas down to a tank coupled to the transmitter plate coil, they each terminate at a single-pole single-throw switch mounted on a $\frac{1}{4}$ by $\frac{1}{4}$ piece, supported by the moulding of the room. From the two S.P.S.T. switches mounted 6 inches apart on the supporting piece, 16 feet of Zepp feeder are brought down to the series tuning condensers. If the feeders dangle, pin them up! This allows either antenna to be switched in in twenty seconds from the operator's chair, and as both are of the same electrical length no retuning is necessary. Note: One 33 foot antenna can be used, if there is not enough space in a given direction for 99 feet.

Transmitter Tricks

The transmitter is a 59 tritron—59 cathode bias regeneration doubler and push-pull tens "final," with about 90 watts input. Extremely low C is used, the kind envisaged when the case calls for push-pull Eimacs at 4000 volts in the doubler and final. In the xtal oscillator one need not be so particular, except with ten-meter operation. One thing of note—it was found that a switch had to be inserted in the plate leads of the oscillator and doubler in conjunction with the xtal oscillator switch in the B- of the 59's. If both B- and B+ leads were not cut, it produced an increase in the background noise of the receiver. This is due to oxide from the filaments getting on the other electrodes in the tube and making little cathodes of them. Plate voltage applied seemed to cause a queer kind of tiny oscillations. Talking of hum again—with the 110 volt plug out of the socket, the operation of the receiver should be noted. If you still hear additional noises with the 59 filaments lighted things should get a good going over. In this case it was found necessary to suspend the 59 filament transformer on rubber bands, to keep its vibration to itself. The rest of the transformers in the set are on only when sending, and the transmitter could jump up and down on the table if it wanted to.

On this simple "rig" WAC has been accomplished five times in two months on 20 meters; also 4 continents have been worked on ten meters in about a month and a half. In conclusion we would like to say that attention to details really does pay!

COIL DATA			
Receiver			
10	20		
Grid— $2\frac{1}{2}$ T.	$5\frac{1}{2}$ T.		
Tickler— $2\frac{1}{2}$ T.	3 T.		
For other coil data refer to the Feb., 1937, Question Box.			

Transmitter

10 Meters

No.	Coil turns	Diameter	Length	Size wire
L3	9	$1\frac{5}{8}$ "	$1\frac{1}{4}$ "	No. 14 en.
L4	6	$1\frac{5}{8}$ "	$2\frac{1}{2}$ "	No. 14 en.
L5	8	$1\frac{5}{8}$ "	$2\frac{1}{2}$ "	No. 14 en.
L6	6	$2\frac{1}{2}$ "	$2\frac{3}{8}$ "	No. 8 en.
L1	8	$2\frac{1}{2}$ "	$2\frac{3}{8}$ "	$\frac{1}{8}$ " copper tube

20 Meters				
L3	10	$1\frac{1}{2}$ "	$1\frac{1}{2}$ "	No. 18 dec.
L4	11	$1\frac{1}{2}$ "	$1\frac{1}{2}$ "	No. 18 dec.
L5	14	$1\frac{1}{2}$ "	$1\frac{1}{2}$ "	No. 18 dec.
L6	12	$2\frac{1}{2}$ "	$2\frac{3}{8}$ "	No. 8 en.
L1	20	$2\frac{3}{4}$ "	$7\frac{1}{2}$ "	$\frac{1}{8}$ " copper tube

Hook-up of 2-Tube Receiver, also Transmitter diagram.

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ONE-TUBE BATTERY SET—Model 1B. Satisfied owners report MARVELOUS FOREIGN RECEPTION. Also other S.W. and broadcast reception same as model 3 A-E. Earphone reception. Complete Kit includes parts listed above plus 50 tube and filament. \$2.45. More expensive **\$2.45 With Phone (unwired)**

TWO-TUBE BATTERY SET—Model 2B. Complete Kit including all parts in the 1-B model plus one extra audio stage including power tube. **\$2.95 With Two Tubes & Phone (unwired)**

THREE-TUBE DE LUXE BATTERY SET—Model 3B. Complete Kit including all parts in the 2-B model plus parts for two extra audio stages including two 30-type tubes and 33. **\$3.45 With Three Tubes**

power output tube. Following accessories are available: 9 1/2 to 20 meter coil 25c; 10 to 45 meter coil (foreign) 25c; 10 to 80 meter coil (foreign) 25c; 22 1/2 volt "B" battery 75c; Two flashlight "A" batteries 10c each; 5" Find-A-Spot Speaker \$1. Complete Antenna Kit \$2; Wood Screw Kit \$1; Earphones 8A-E, each 45c. Long Wave Unit and coil for any model \$1. Double Earphones \$1.30. Any model wired extra 75c.

NOTE: If you already have earphones, two extra foreign coils may be substituted in any model.

H. G. CISIN, Chief Eng., ALLIED ENG. INSTITUTE
98 Park Place Dept. S-37 New York, N.Y.

New "Television" Sign

The Times Square evening crowds in New York City have recently been entertained by a sign which represents a close approach to television. It was built by Douglas Leigh of New York City, and 2,000 incandescent lamps (50,000 watts), used in connection with a new method of rapid switching, permit the moving images or drawings to be flashed to the public.

This newest type animated sign, which so nearly approaches television, has created a very favorable impression. One of the reasons why this sign is an improvement over previous attempts at similar signs, is due to the fact that the switching method for lighting the desired lamps to reproduce a given drawing or sketch works so smoothly and quickly. This new idea was developed in Stockholm, Sweden. Some of the animated cartoons occupy, for example, an eight minute cycle and include such subjects as a horse that runs, kicks, jumps, dances, skates, etc. Also running signs that operate like a movie trailer.

This sign entertains and advertises simultaneously, and one of the new features is that it is no trouble to change "copy," and the sign may carry different "copy" continuously, extending from one minute to an hour or more of constant changes.

Our information bureau will gladly supply manufacturer's names and addresses of any items mentioned in SHORT WAVE & TELEVISION.



New sign in New York City resembles television.

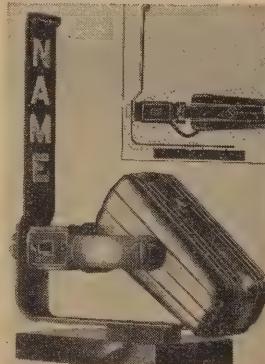
New Desk Stand Contest

THE new Amperite desk stand shown in the accompanying picture has been designed for both utility and beautiful appearance. It represents quite a radical departure from the usual type microphone stand.

By placing the microphone horizontally, the center of gravity is lowered, thus making the stand unusually stable. The leaf spring suspension also acts as an excellent shock absorber; the microphone can be rotated into practically any position. Its horizontal position makes it excellent for pulpit, desk and foot-light installations. This handsome microphone stand is finished with a black base and a chrome-plated spring. An attractive feature is a name plate which can be provided, as shown, with any number of letters up to ten.

The Amperite Company offers a microphone and stand as first prize for the best name for the stand. Duplicate awards will be made in the case of a tie. Those who submit the ten next best names, in the opinion of the judges, will be awarded a microphone stand also.

The contest closes July 1st. The judges will be John Rider, of Rider's Manual and Joseph Kaufman, Director of Education, National Radio Institute.



(No. 628)

Get These Books **FREE!**

Now you have the opportunity to add one or two new SHORT WAVE & TELEVISION books to your library. A subscription to the sensationally small cost of One Dollar brings to you your choice of the books illustrated and described below. For One Dollar you will receive SHORT WAVE & TELEVISION for fourteen months. BOTH books sent to you absolutely FREE. UNDER NO CONDITIONS CAN EITHER OF THESE BOOKS BE PURCHASED. ANOTHER SAVING FOR YOU—THE PUBLISHERS PAY POSTAGE ON THE BOOK OR BOOKS YOU CHOOSE.

ABC OF TELEVISION
This book contains only the latest material available on Television. It is written by a well-known radio authority.

Partial Contents of ABC of Television

The simplest television receiver; how the iconoscope works; the Nipkow disc and its relation to television; the photo-electric cell; neon lamps; brief description of several modern television systems; need for a large number of picture elements; need for broad channel width in transmission of high-fidelity television signals. The use of the cathode ray tube in television receivers; necessary associated equipment used in cathode-ray tubes; How a television station looks and operates—The Iconoscope—the most common system of television transmission—The future of television.

64 PAGES—100 ILLUSTRATIONS. Stiff, Flexible Covers, 5 1/4x8 1/4 INCHES

SHORT WAVE GUIDE
It is an excellent book—recommended by short-wave enthusiasts everywhere.

Partial Contents of Short Wave Guide

SHORT-WAVE QUESTIONS AND ANSWERS—SHORT-WAVE KINKS. Illustrated—HOW TO BUILD SIMPLE SHORT-WAVE RECEIVERS WHICH IS THE BEST TYPE OF AMPLIFIER TO USE?—A SIMPLE "HAM" TRANSMITTER—All the details, including construction of parts, wiring diagrams and constructional hints. Building a simple "ham" transmitter will be found in this book—PRACTICAL HINTS ON SHORT-WAVE TUNING.

64 PAGES—196 ILLUSTRATIONS. Stiff, Flexible Covers, 5 1/4x8 1/4 INCHES

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 TWO DOLLARS is enclosed. Send SHORT WAVE & TELEVISION for fourteen months and send the BOTH BOOKS ABSOLUTELY FREE. (Canadian and Foreign \$2.60)

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Send remittance in form of check, money order or unused U.S. postage stamps. (Foreign: International Postal Money Order.) Register letter if you send cash.

WESTINGHOUSE POWER GENERATOR

Manufactured for U. S. Signal Corps

A.C. Electrical 200 Watt Power 110 V. AC

from a Windmill, from available Waterpower, from your Automobile, from your Tricycle, from your Bicycle, Foot-pedals or Handcrank for transportable Radio Transmitters, Strong Floodlights, Advertising Signs; etc. You can use to operate AC. Radio sets from 32 V. DC farm light systems; operate two generators in series to get 200 V. AC; obtain two phase and three phase AC, etc., etc. 1/2 to 1/2 H.P. needed to run generator.

There Are Over 25 Applications, such as: A.C. Dynamo light from eight to ten 20 Watt 110 Volt lamps. Short light from dynamo supplied by 200 Watts A.C. for operating "Ham" Transmitter. Operating 110 V. 60 Cycle Radio Receiver in DC districts. Motor Generator. Public Address Systems. Electric Sirens on motor boats, yachts, etc. Camp Lighting, etc., etc.

Blueprint 22x28 in., and Four-Page 8 1/2x11 in. Instruction Sheets. Generator, as described including four replacement carbon brushes. Shipping weight 18 lbs. **\$7.90**

We will forward Shipments by Express Collect if sufficient postage is not included.

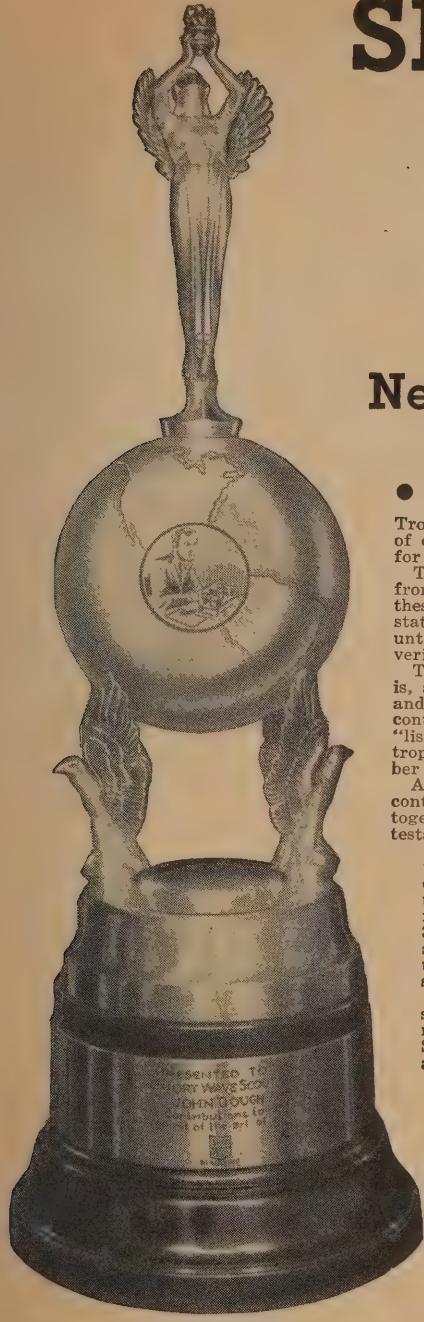
WELLWORTH TRADING CO.

560 W. Washington Blvd., Dept. SWT-737, Chicago, Ill.

The only magazine of its kind in the world! See page 150.

SHORT WAVE SCOUTS

New "Continent" Scout Trophy Contest



ON THIS page is illustrated the handsome trophy which was designed by one of New York's leading silversmiths. It is made of metal throughout, except the base, which is made of handsome black Bakelite. The metal itself is quadruple silver-plated, in the usual manner of all trophies today.

It is a most imposing piece of work, and stands from tip to base 22½". The diameter of the base is 7½". The diameter of the globe is 5¼". The work throughout is first-class, and no money has been spared in its execution. It will enhance any home, and will be admired by everyone who sees it.

The trophy will be awarded every month, and the winner will be announced in the following issue of SHORT WAVE & TELEVISION. The winner's name will be hand engraved on the trophy.

The purpose of this contest is to advance the art of radio by "logging" as many short-wave phone stations, amateurs excluded, in a period not exceeding 30 days, as possible by any one contestant. The trophy will be awarded to that SHORT WAVE SCOUT who has logged the greatest number of short-wave stations during any 30-day period.

No Entries This Month!

Come on fellows, what's wrong? This is the first time in many months that we have failed to receive an entry for the Short-Wave Scout Trophy! Read the simple rules which explain how easy it is to win one of these handsome "silver trophies" which stand nearly 2 feet high!—Editor.

Notice To Trophy Contestants

- The closing date for the Asia contest announced in the May issue, has been advanced from June 25th to August 25th, in order to provide sufficient time for the veris to reach the contestants from Asiatic stations. Note: We are also including in the Asia group, short-wave stations in the Philippines and the East Indies.

The group for which entries must be in the Editor's hands by September 25th are Australia, Africa and Oceania.

TWO SIZZLING HAM SPECIALS



2A3H Heater-type Triode Power Amplifier made by a nationally known manufacturer. Each individually boxed and guaranteed. No. XXI3.
YOUR COST. Each..... **39¢**

BRUSH CRYSTAL PHONES

Can be used as a crystal mike. Uses a two-plate bimorph element with silver electrodes and specially built 1½" cone drive unit. Frequency range 60-10,000 cycles; high output; high impedance. In molded brown bakelite case. No. 13922—with metal handband and 5 foot cord.



\$2.94

No. 13923—with chrome plate and black enamel handle. Extends from 12 to 17". 5 foot cord.

\$3.82

NEW HAM CATALOG MAIL COUPON FREE

WHOLESALE RADIO SERVICE CO., INC.

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Rush FREE Ham Catalog 66-4G7.

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WORLD WIDE RADIO ALL WAVE RADIO

SPECIAL!! For a Limited Time Longer!



The sensational "Ace Dace" Two Tube receiver for only \$2.25! Thousands sold at regular \$3.00 price. **THIS MONTH ONLY**—for \$2.25 we send you, postpaid, the complete kit containing an attractive metal chassis, parts needed to build this powerful all-electric short and long wave receiver, un wired, less tubes, batteries, phones. **AMAZING VALUE!** Can actually bring in foreign stations from all parts of the world, police calls, airplanes, amateurs, etc., as well as your local stations! Ace radios give **GUARANTEED RESULTS!** Our clear diagrams make it simple to hook-up. Free Circular.

ONE TUBE Battery operated receiver. Complete kit of parts, un wired, less tube, batteries, and phones. **\$1.25**

TWO TUBE Battery receiver. For most power and volume buy this excellent beginner's receiver! Complete Kit— **\$2.00** Unwired, less tubes, batteries, phones.

Any kit laboratory wired and tested 75¢ extra. First grade tubes—75¢ each. Double hot chassis—\$1.15 REMEMBER! We pay the postage. Saves you up to 50c. ENJOY NEW THRILLS!! SEND FOR YOUR ACE RADIO TODAY!

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RADIOS.. SAVE UP TO 50%



DEAL DIRECT. FACTORY PRICES! Minimum order to select from: AC-DC-AM-FM sets. Farm sets that operate like city radios! Your name and address on postcard brings you NEW Bargain Catalog in color. **FREE**. Get details on our new and agent-user proposition! GOLDENTONE RADIO CO. Dept. C-7, DEARBORN, MICHIGAN

COMPLETE ELECTRIC PLANTS

ONAN ALTERNATING CURRENT PLANTS furnish same as city current anywhere. Operate on gasoline. Run Radio, Water System, Refrigerator, all Appliances. Complete, ready to run. **SIZES 350 WATTS UP**

Easy to install. Available from stock. For Farms, Camps, Commercial use. Sizes for any purpose. Write for details. D. W. ONAN & SONS

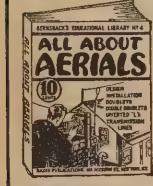
557 Royalston Ave. Minneapolis, Minn

There is regular fifty cent value in this 10c series of radio 10c books!

RADIO FANS! Help yourselves to a radio education for the price of forty cents (10c per book). These books give you a good foundation towards the study of radio. You'll be amazed at the wealth of information contained in them. They are especially written for beginners but are useful review and reference books for all.

ALL ABOUT AERIALS

In simple, understandable language this book explains the theory underlying the various types of aerials; the inverted "L," the Doublet, the Double Doublet, etc. It explains how noise-free reception can be obtained, how low-impedance transmission lines work; why transposed lead-ins are used. It gives in detail the construction of aerials suitable for long-wave broadcast receivers, for short-wave receivers, and for all-wave receivers. The book is written in simple style. Various types of aerials for the amateur-transmitting station are explained, so you can understand them.



ALTERNATING CURRENT FOR BEGINNERS

This book gives the beginner a foothold in electricity and radio. Electric circuits are explained, this includes Ohm's Law, alternating current, sine waves, volts, amperes, watts, condensers, transformers, motors and generators, A.C. instruments, housewiring systems, electrical appliances and electric lamps.

Here are some of the practical experiments which you can perform. Simple tests for differentiating between A.C. and D.C.; how to light a lamp by induction; making a simple electric horn; demagnetizing a watch; testing motor armatures; charging storage batteries from A.C. outlet; testing condensers with A.C.; making A.C. electro magnets; frying eggs on a cake of ice; making simple A.C. motors and many others.



HOW TO MAKE THE MOST POPULAR ALL-WAVE 1- AND 2-TUBE RECEIVERS

This book contains a number of excellent 1- and 2-tube sets, some of which have appeared in past issues of RADIO-CRAFT. These sets are not toys, but have been carefully engineered. They are not experiments. To mention only a few of the sets the following will give you an idea. The Megadyne 1-Tube Pentode Loudspeaker Set, by Hugo Gernsback—Electrifying The Megadyne—How to Make a 1-Tube Loudspeaker set, by W. P. Chesney—How to Make a Simple 1-Tube All-Wave Electric Set, by F. W. Harris—How To Build A Four-in-Two All-Wave Electric Set, by J. T. Bersnley, and others.



HOW TO BUILD FOUR DOERLE SHORT-WAVE SETS

Due to a special arrangement with the publishers of SHORT WAVE CRAFT, we present in this book complete details for building the Doerle sets, also an excellent power pack if you plan to electrify any of the sets. Contains EVERYTHING that has ever been printed on these famous receivers. These are the famous sets that appeared in SHORT WAVE CRAFT: "A 2-Tube Receiver that Reaches the 12,200 Mile Mark," by C. Doerle, "A 3-Tube 'Signal Gripper,'" by Walter C. Doerle, "The Doerle '2-Tuber' Adapted to A.C. Operation," "The Doerle 3-Tube 'Signal Gripper' Electrified," and "The Doerle Goes 'Band-Spread.'"



RADIO PUBLICATIONS
101 Hudson Street, New York, N. Y.

SWT-737

Please send immediately books checked:

- How to Build 4 Doerle Short-Wave Sets, No. 1.....10c
- How to Make the Most Popular All-Wave 1- and 2-Tube Receivers, No. 2.....10c
- Alternating Current for Beginners, No. 3.....10c
- All About Aerials, No. 4.....10c
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- Send me FREE circular listing 48 new 10c publications.

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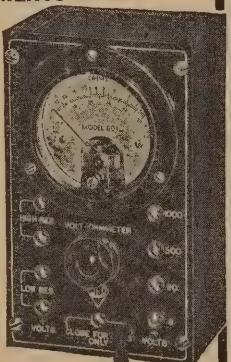
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MODEL 801 Volt-Ohmmeter

A sensitive, compact and accurate volt-ohmmeter that will be the busiest instrument in your "lab," or out on jobs. DC voltage readings .0-5-50-500 and 1000. resistance readings from $\frac{1}{2}$ to 500 and 200 to 500,000 ohms. Will read from 0 to 1 Ma. Low resistance range direct reading. Meter has 1000 ohm per volt sensitivity. Battery is self contained. Panel is clearly lettered.

DEALERS NET PRICE WITH BATTERY

Model 801-A—Similar to above, with following readings available—0/5/50/500/1000 volts D.C., 0/5/50/500/1000 volts A.C., 0/500/500,000 ohms. Net Price.....\$11.95



\$5.75

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RADIO CONTROL →
for MODEL BOATS, etc.
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More DATA PRINTS ↓
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100 Mechanical Movements
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Construction Data.....50c

The DATA PRINT Co.
Lock Box 322
RAMSEY, N. J.



The group in which entries must be in our hands by October 25th, includes the veris from European short-wave stations, including Iceland.

For entries to be in the Editor's hands by November 25th, North America (including Central America, West Indies, Canada and Mexico) veris are to be in by that time.

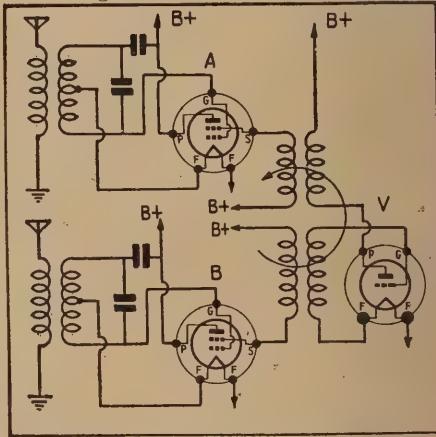
For entries to be in our hands by December 24th, South American stations are the objective.

World-Wide S-W Review

Edited by C. W. PALMER

Super-Regeneration in a Television Receiver

Wireless World (London) presents an interesting circuit which should have

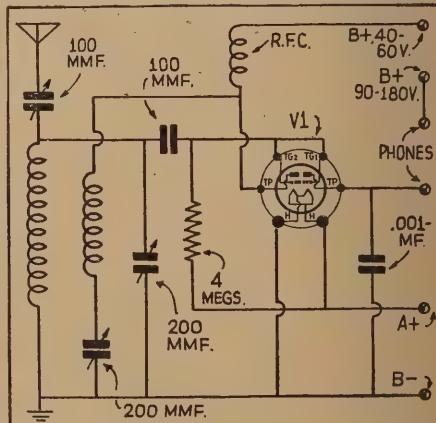


How super-regeneration may be used in a television receiver.

bearing on the development of television receivers.

Two tubes A and B receiving modulated carrier waves of different frequencies, such as the sound and picture signals of a television program, are back-coupled to work as super-regenerators and both are "quenched" from a single local oscillator tube, V.

The tube A is beat from the plate circuit and tube B from the grid circuit of the tube V. The supply circuits are decoupled.



Separate Regeneration Control

The two tube actions can be very nicely obtained by the use of a "twin triode" or class B tube, as described in a recent issue of English Mechanics (London).

It will be noticed that the grids of both sections of the tube are connected together. The plate circuit of one section includes the R.F. choke and connections to the regeneration coil via the controlling condenser to ground. The other plate circuit contains the phones or the output leads to an A.F. amplifier if one is used.

BOOK REVIEW

TELEVISION, THEORY AND PRACTICE, by J. H. Reyner, Consulting Engineer. Size, 6x8½ in., 196 pages, 88 illustrations, cloth-bound. Published by the Sherwood Press, Cleveland, Ohio.

What is Television? is the opening chapter title; this chapter includes such important elements as Scanning, Building Up the Picture, Frequency Limitations, etc. Succeeding chapters deal with The Television Art as Found in Practice, Light Cells, Synchronism, Framing, The Eye in Television, Various Optical systems—including the Mirror Drum—Polarized Light—The Kerr cell.

Photo Cells of Various Types, their Sensitivity, High Frequency Response and Circuits are discussed and illustrated. The Cathode Ray Tube and Its Operation is described, as well as the Time-Base Circuits—Synchronization—The Iconoscope—The Farnsworth and Zworykin systems, etc.

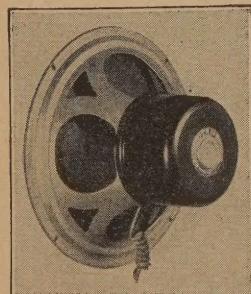
Film Television, The Television Receiver, Velocity Modulation and Color Television are covered in succeeding chapters. A section is devoted to Continental Television Practice and Short-Wave Television; a final chapter entitled, "Television Tomorrow—Its Entertainment Value" completes the treatise, plus an index.

"200 METERS AND DOWN"—The Story of Amateur Radio. By Clinton B. DeSoto. Size, 6½ by 9¾ inches. 184 pages, flexible heavy paper covers. Published by the American Radio Relay League, West Hartford, Conn.

For the first time the extremely interesting story of Amateur Radio—from 1908 to the present day—is told by one who has been very close to the subject—Clinton DeSoto, Assistant Secretary of the American Radio Relay League.

Mr. DeSoto has traveled a great deal and been in very close contact with the operators of Ham stations; further he has taken the trouble to delve deeply into the early history of amateur radio communication in the United States. He devotes an interesting section to the early activities of Hugo Gernsback and the work he did for Amateur Radio, beginning way back in 1908, together with the establishment of the first experimental radio magazine, Mr. Gernsback's brain-child *Modern Electrics*, and the establishment of *The Wireless Association of America*, also his later publication, *The Electrical Experimenter*, and the formation of the *Radio League of America*. Many other names familiar to the "old-timer" in Amateur Radio received their due mead of credit, including such men as A. P. Morgan, George Eltz, Ellery W. Stone, etc.

New P.M. Speaker Line



(No. 627)

A NEW line of Permanent Magnet Dynamic speakers developed by Utah Radio Products Company has been expanded to meet practically all radio and sound system requirements, according to a recent announcement by Ira J. Owen. Thirty-four models are available, with cone diameters ranging from five inches to fourteen inches, employing magnets weighing from five to forty-six ounces, and with output capacities as high as thirty watts! A new type of molecular structure in the magnet greatly lengthens magnetic life; over a period of years there is no audible decrease in speaker efficiency.

This article has been prepared from data supplied by courtesy of Utah Products Company.

CLASSIFIED

Advertisements are inserted at 5c per word to strictly amateurs, or 10c a word to manufacturers or dealers. Each word in a name and address is counted. Cash should accompany all orders. Copy for the August issue should reach us not later than June 5.

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GOLD LETTERS FOR STORE Windows. 500% Profit. Free Samples. Metallic Co., 433-R N. Clark, Chicago.

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SKYRIDERS HALLCRAFTERS bargains, many makes new and used, will trade. Also trade Leica and Zeiss and Lenses. Wells-Smith, 71 E. Adams St., Chicago. Formerly at 26 N. Wells St.

MASTERPIECE IV—RARE BAR-gain \$110. White Baltzly, 1711 River-side Ave., Muncie, Ind.

SELL: HALLCRAFTER S K Y Buddy \$24.50. W3FYW, Ardmore, Pa.

FIVE INCH CATHODE RAY Televisor—with complete tubes \$59.87. W8NVN, Lansing, Michigan.

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AMATEUR RADIO, COMMERCIAL Radiotelephone and Radiotelegraph licenses, complete training. Resident and correspondence courses. Every graduate a licensed operator. N. Y. Wireless School, 1123 Broadway, New York.

LEARN MORSE CODE. NEW method brings voice of teacher and live messages into your own home. Complete practical course with album of records, text and electric key set—\$15. Send for circular SW, Linguaphone Institute, Rockefeller Center, New York.

RADIO-CRAFT is devoted to all phases of radio, to servicing, and to the advanced set builder. Brings you shortcuts that show you the way out of difficult problems. Latest Radio Equipment is illustrated and described. Then there's the International Radio Review, Service Data Sheets, New Tubes, Radio Month in Review, Set Construction, Television, Operating Notes, and other interesting departments. Edited by Hugo Gernsback. Over 175 Illustrations in each issue.

More and More Radio Men Are Reading RADIO-CRAFT!

RADIO-CRAFT is devoted to all phases of radio, to servicing, and to the advanced set builder. Brings you shortcuts that show you the way out of difficult problems. Latest Radio Equipment is illustrated and described. Then there's the International Radio Review, Service Data Sheets, New Tubes, Radio Month in Review, Set Construction, Television, Operating Notes, and other interesting departments. Edited by Hugo Gernsback. Over 175 Illustrations in each issue.

RADIO-CRAFT, 99 C Hudson Street, New York, N. Y.

AMERICA'S MOST POPULAR RADIO BOOKS

We herewith present a selected collection of recent important radio books. We have selected these volumes because they represent the foremost radio books of their kind in print today. We publish no catalog. Order direct from this page. Prompt shipments will be made to you. Remit by money order or certified check. Register all letters containing cash.

SHORT WAVES, 384 pages, 258 illus. \$.69

PRACTICAL TELEVISION, 223 pages, 127 illus. \$3.69

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FOUNDATIONS OF RADIO, 246 pages, 145 illus. \$2.47

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SHORT WAVE RADIO HANDBOOK, 128 pages, 150 illus. \$1.00

PRINCIPLES OF RADIO, 478 pages, 306 illus. \$3.46

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DRAKE'S CYCLOPEDIA OF RADIO AND ELECTRONICS, 1050 pages, 1178 illus. \$4.88

MISCELLANEOUS

WE ORIGINALLY HAD FIVE thousand Stoppani Compasses for which the U.S. Government paid over \$30.00 each. We sold all but a very few. We cannot obtain more to sell at three times our present price. Send in your order before they are all sold at \$4.50 each, postage paid. Gold Shield Products, Room 14, Eleventh floor, 99 Hudson St., New York City.

COIL INDUCTANCE CHARTS complete set for any size coil; accurate; \$2.15 prepaid. Slide Rules—4 inch circular type \$2.00; 8" dia., 20" scale, \$5.00 prepaid. Dataprint Co., Box 322, Ramsey, N. J.

IDENTIFICATION MEDALS FOR key rings. Name, Call Letters, and Address. Only 20¢ prepaid. Dave Gordon, 113 Kentucky Ave., Lexington, Ky.

PATENT ATTORNEYS

INVENTORS, ALL PATENT AND TRADEMARK cases submitted given personal attention by members of the firm. Form "Evidence of Conception" and instructions free. Lancaster, Allwine & Rommel, 436 Bowen Building, Washington, D. C.

QSL CARDS—SWL

100 NEAT SWL CARDS PRINTED with your name and address sent post-paid for \$1. Bunch of samples and RST chart for five cent stamp. W1BEF, 16 Stockbridge, Lowell, Mass.

DIRECTORY OF SHORT WAVE LISTENERS 25c. Listing of Name & Address along with 8½" x 15" Certificate one year, 25c. Write SWL Directory, Sta. B, Box 116, Toledo, Ohio.

SWL, QSL CARDS. ATTRACTIVE Reply getters. Samples (Stamps) W-8-E-S-N, 1827 Cone, Toledo, Ohio.

QSL SWL CARDS. NEAT, ATTRACTIVE, reasonably priced, samples free. Miller, Printer, Ambler, Pa.

RADIO EQUIPMENT

ALUMINUM NAME PLATES. 7 for 25¢ prepaid. Made to your specifications. Dave Gordon, 113 Kentucky Ave., Lexington, Kentucky.

SHORT WAVE RECEIVERS

BLUEPRINT DISTANCE RECORD crystal set, 17 others, with "Radio-builder," year—25c. Laboratories, 151-A Liberty, San Francisco.

TELEVISION

TELEVISION KITS AND PARTS. Arthur Pohl, 2123 Hubbard, Detroit, Mich.

8 Months \$1 for

15 HANDY—POCKET-SIZE RADIO BOOKS

Here are 15 up-to-date books on radio and air conditioning. Modern in every sense. All BOOKS UNIFORM from 64 to 72 pages; 50 to 120 illustrations. All books written by well-known authors. Order by Number.

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4. MODERN RADIO HOOKUPS, By R. D. Washburne

5. HOW TO BECOME A RADIO SERVICE MAN

6. BRINGING ELECTRIC (RADIO) SETS UP TO DATE, by C. E. Denton

7. RADIO KINKS & WRINKLES (for Experimenters)

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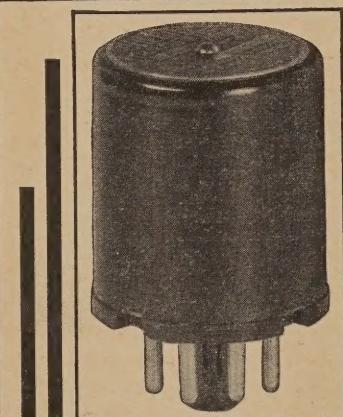
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The transfilter fills the selectivity gap between the electrically tuned circuit and the quartz filter. A transfilter can be employed in any superheterodyne whose intermediate frequency amplifier can be tuned to 465 kilocycles.

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Identifying S-W Stations

By Joe Miller

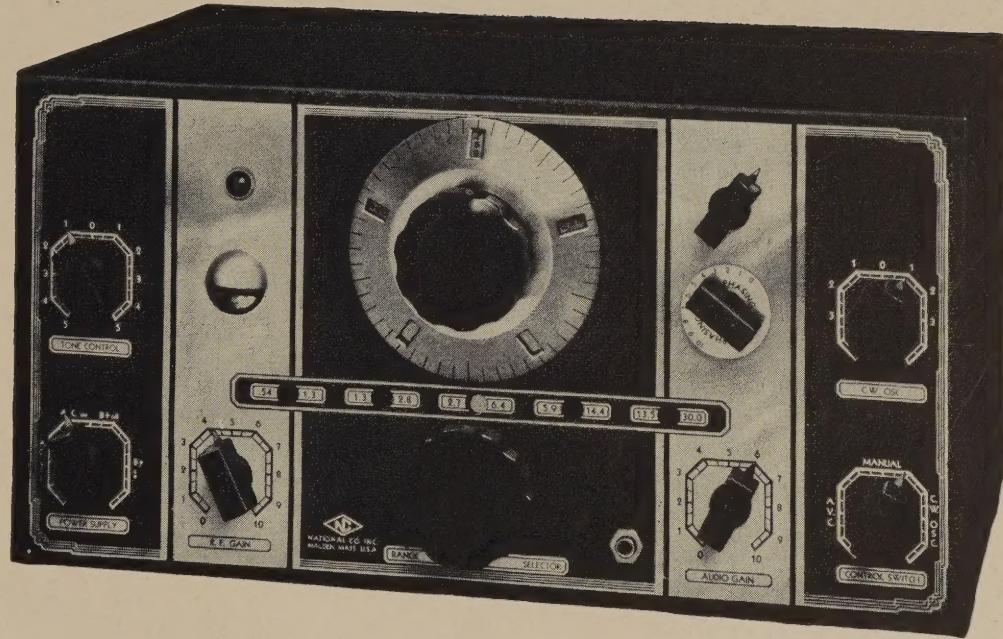
B—Broadcast C—Commercial Stations
Part One

Freq. Mc.	Station Call	Identification
21.45	OLR6A	B—A melody from "New World Symphony," by Anton Dvorak heard at beginning and end of broadcasts.
20.04	OPL	C—Leopoldville, Belgian Congo. Calls "Allo Bruxelles" repeatedly, speaks in French. Phones ORG.
19.98	KAX	C—Manila, Philippines. Calls sometimes given before transmission: "This is station KAX, Manila on 19980 kc., now—" Inverted always used during transmission.
19.62	VQG	C—Nairobi, Kenya Colony. Calls London, mentioning "Nairobi calling." Inverted used.
19.345	PMA	C—Bandoeng, Java. Calls "Allo, Amsterdam." Inverted used.
19.355	FTM	C—St. Assise, France. Sends 4 note musical signal before transmissions and while standing by.
19.206	ORG	C—Brussels, Belgium. Phones OPL in French and S. A. in Spanish.
19.02	HSSPJ	B—Bangkok, Siam. Not used at present. See HSSPJ, 9.35 mc.
19.016	HSE2	C—Bangkok, Siam. Works Manila, Tokyo and Germany. Uses inverted. Now used in place of HSP for telephony.
18.97	GAQ	C—Rugby, England. Works ZSS using inverted.
18.91	JVA	C—Nazaki, Japan. Code sometimes before transmissions. Uses inverted. Calls in English at start and end of transmission.
18.89	ZSS	C—Klipheuvel, South Africa. Phones GAU or GAQ, Rugby, using inverted. Fading signal, moving back and forth about once per second.
18.83	PLE	C—Bandoeng, Java. All announcements in phone work, English, inverted always used. See PLV, 9.415 mc.
18.62	GAU	C—Rugby, England. Phones ZSS, VVY, and U. S. A. Inverted always used.
18.40	PCK	C—Kootwijk, Holland. Calls "Allo, Bandoeng," phoning Java, uses inverted.
18.388	FZS	C—Saigon, Indo-China. Calls "Allo, Paree, ici Saigon," uses inverted. Has very rapid flutter on signal.
18.27	IUD	C—Addis Abeba, Ethiopia. Calls "Pronto Roma, da Addis Abeba." Uses clear speech, in Italian. Uses "Pronto" often during conversation. Man or woman may be heard. Often works IAC.
18.135	PMC	C—Bandoeng, Java. Calls Holland, speaking Dutch, uses inverted.
17.775	PHI	B—Huizen, Holland. Calls in 7 languages, including English. Interval signal, metronome, with 80 beats per minute. Closes with Netherlands National Anthem.
17.73	HSP	C—Bangkok, Siam. Now uses modulated CW only. Phone transmissions rerouted to HSE2, 19016 mc.
17.70	IAC	C—Coltano, Italy. Phones IUG, others, calls at beginning, and irreg. throughout: "Pronto—da Radio Coltano." Always clear speech, in Italian.
17.70	JFZC	C—Nippon Yusen Kaisha Liner "Chichibu Maru," identifies at start and finish of phone transmissions. Uses inverted. Also JFZC, 6.65 mc.
17.545 to 17.480	WVY2	C—Poona, India. Varies frequency, occasionally, inside these limits. Phones London, using inverted, occasionally testing in clear speech.
17.28	FZE8	C—Djibouti, Fr. Somaliland. Calls "Allo, Paris, ici Djibouti." Speaks French.
16.385	ITK	C—Mogadiscio, Italian Somaliland. Calls in Italian, "Pronto—da Mogadiscio". Calls Addis Ababa, Roma and Eritrea. Uses clear speech, in Italian.
16.25	FZR	C—Saigon, Fr. Indo-China. Calls "Allo, Paree, ici Saigon." Uses inverted, usually phoning FTK, 15.88 mc.
16.24	KTO	C—Manila, Philippines. Call given at beginning and end of transmissions: "This is station KTO, Manila, on 16240 kc., now—" Inverted always used.
16.155	KBT	C—Manila, Philippines. Call given in code before transmissions. Inverted always used. Address: See KZGF, 6.46 mc.
16.117	IRY	C—Rome, Italy. Phones ITK and IDU. Calls "Pronto—da Roma." Clear speech in Italian.
16.03	KKP	C—KKS; C-K6XO; C—Kahuku, Hawaii. Call at beginning and end of all transmissions. Inverted used, except when experimenting, when call K6XO is used. (To be continued)

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(While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this index.)	

PERFORMANCE PLUS:



Built for *extra* performance, the twelve tube NC-100 Receiver includes every refinement for difficult short wave work. Among its many unusual features is the unique Movable Coil Tuning Unit which combines the high electrical efficiency of plug-in coils with the convenience of the coil switch. Tuning from 540 KC to 30 MC is covered in five ranges, so that stations are well spread out. Each of the fifteen high frequency coils is shielded in its own compartment of cast aluminum. The turn of a knob on the front panel brings the desired range into position and plugs it in. Idle coils are isolated, leads are short, and calibration is exact. There are no dead spots in the NC-100 Receiver.

Fully worthy of the advanced performance of the Tuning Unit are other details of the superheterodyne circuit. Thorough use of low loss insulation and of air-dielectric condensers, together with carefully designed high-Q coils, results in exceptionally high signal-to-noise ratio and high usable sensitivity. The advanced design of the (optional) Crystal Filter provides unusual effectiveness when QRM is severe.

Panel controls are complete, and include separate switches for B-supply, Filaments, CW Oscillator, and AVC; as well as dials for Audio Gain, RF Gain, Tone Control, and CW Oscillator Tuning. Crystal Filter controls include Phasing and Selectivity. The precision Micrometer Dial, direct reading to one part in five hundred, provides exceptional ease of tuning together with great accuracy in logging.

These are but a few of the features that combine to make the NC-100's performance so outstanding, and its low price so remarkable. An illustrated folder will be mailed on request if you mention Dept. S-7.

Announcing



**Leading Radio Columnist
HANDS AN ORCHID
to the Super Sky Rider†**

Visited by Diplomats

On Wednesday evening I was honored to entertain B. P. Stoyanovitch, Consul General of Yugoslavia, and his staff while we listened to a special broadcast up among the megacycles from Belgrade.

With a battery of five communications receivers which had been warming up for hours, I sat down full of confidence and started spinning dials. Well, maybe not confidence, exactly, but hope, anyway. But imagine my embarrassment when minutes passed and we logged practically everything in the world except Belgrade.

However, at the end of about fifteen minutes we dragged in a speech in an unfamiliar language, and immediately Mr. Stoyanovitch burst forth in happy smiles. It was the voice of the Prime Minister of Yugoslavia and the receiver that did the trick was the old reliable SX11 superskyrider. After trying for a few minutes to log the program on the other receivers, just by way of something to fall back on in case of emergency, but having no luck, we turned off the others and sat back to listen. And if you don't think a terrible weight was lifted from my brow when the skyrider did its stuff, then you never had eleven officials of a foreign nation standing skeptically by while you try to produce results in short wave radio reception.

the New 1938 **SUPER SKY RIDER**

THE HALICRAFTERS' GREATEST ACHIEVEMENT

Imagine a receiver that gives you complete coverage from 5 to 550 meters, taking in everything from the 5 meter band to the top of the broadcast band—with wide range variable selectivity (single signal razor-sharpness to true high fidelity*)—with an ingenious, new, electrical band-spreading device** that provides 1000° of band spread—an "S" meter that works on weak signals—with improved image and signal-to-noise ratio, and a dozen other outstanding features. Now you can listen to two-way police communications on 7½ meters—to the interesting and active new 5 meter band—in fact to everything on short waves and the broadcast band as well.

Imagine all this on one receiver—there's not another feature the amateur or short wave listener could possibly desire. It's absolutely revolutionary in performance and scope. It's the New 1938 Super Sky Rider, now on display at your dealer's, at an amazingly low price for so much value. Available on Hallicrafters' liberal Time Payment Plan. See it today!

*R. M. A. has defined High Fidelity as 7000 cycles at 20 D. B. down.

**Patent applied for.

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"S" Meter.

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Improved Expanding I. F. Transformers.

Improved Crystal Filter Control.

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